CLIPSAL®
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C-Bus® Basic Training Manual
Volume 2

2A. C-Bus® Toolkit Software

2B. Basic Programming

2C. Advanced Programming

2D. DLT

2E. Network Bridges

2F. Fault Finding

Revision Number: V2

INTEGRATED SYSTEMS

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V2 November 2007

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Volume 2A
C-Bus Toolkit Software

Scope

This manual aims to provide an installer with the basic skills needed to program and use C-Bus®. A fundamental technical background is required.

This manual covers:

- Various C-Bus Network specifications
- C-Bus addressing concepts

It is an ideal preparation before attending the C-Bus Basic Training Course.

Learning Outcomes

By the end of this module, you should have an understanding of:

- Various C-Bus cabling requirements
- Various single Network topology configurations
- Various C-Bus Network parameters
- Differences between the various C-Bus Addresses.

1.0 PC Requirements

Before installing the C-Bus® Toolkit software, ensure your PC meets the requirements below.

1.1 Hardware Requirements

To run the C-Bus Toolkit you need a PC with at least:

- Windows 98
- 128 MB of RAM
- A Pentium II class processor or equivalent
- 250 MB free hard drive space
- A minimum Screen Resolution of 800 × 600
- A Serial COM port or Ethernet adaptor (or USB port and USB to RS-232 converter).
- A CD-ROM drive (or USB drive) to load the software.

For best performance it is recommended you use a PC with at least:

- Windows XP
- 1 GB of RAM
- A Pentium III class processor or better
- 1 GB free hard drive space
- A Serial COM port or Ethernet adaptor
- A CD-ROM drive (or USB drive) to load the software.

1.2 Operating System

The C-Bus Toolkit requires a Microsoft Windows operating system (Windows 98 or above). It is not available for any other operating system platform. Windows 2000 or XP is recommended for best performance.

2.0 Installing the Software

The C-Bus Toolkit software is available in a .zip file format. This provides smaller file size.

The installation package may be downloaded from the Technical/Downloads/Software section of the CIS website http://www.clipsal.com/cis.

Installation Package

This package is suitable for a new installation of the C-Bus® Toolkit, or upgrading. It installs all the components needed for you to run the C-Bus Toolkit.

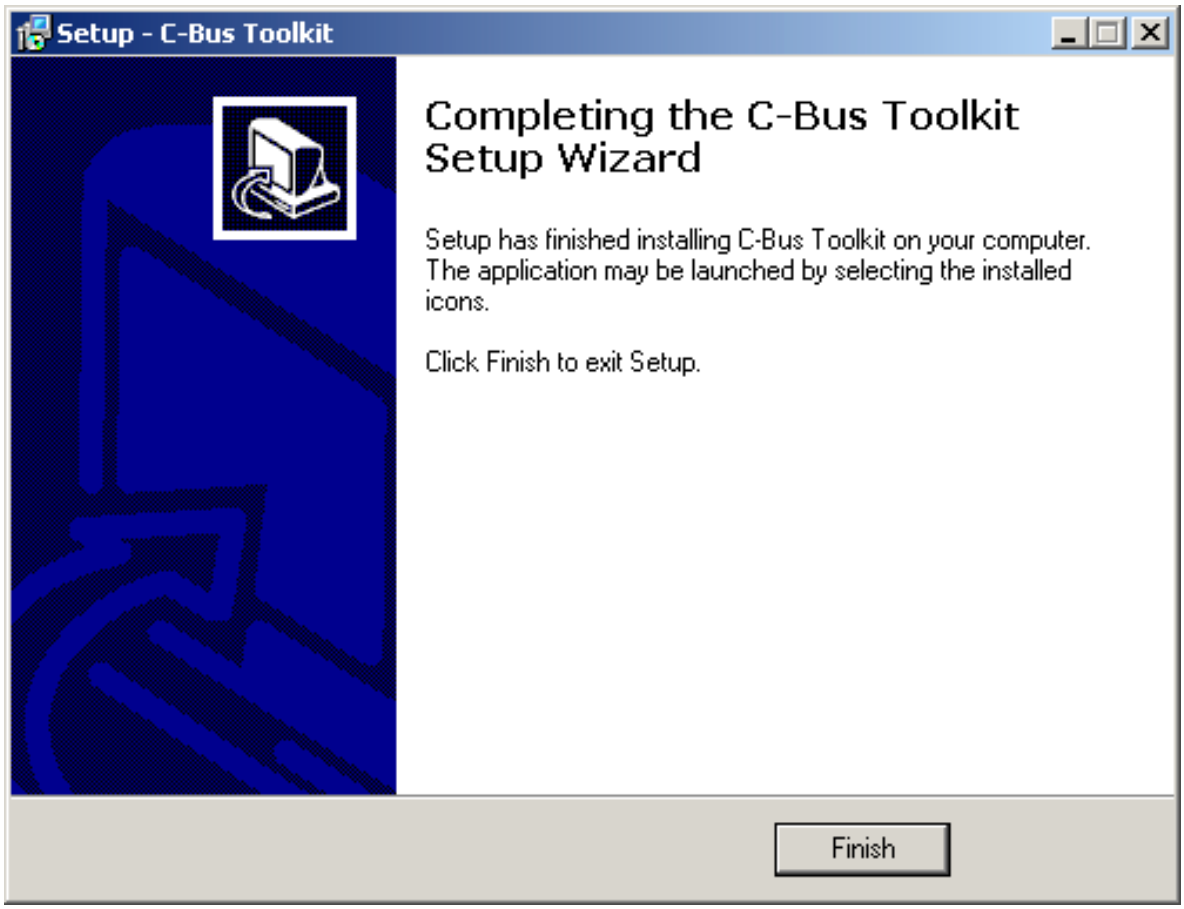

Setup - C-Bus Toolkit
Completing the C-Bus Toolkit Setup Wizard
Setup has finished installing C-Bus Toolkit on your computer. The application may be launched by selecting the installed icons.
Click Finish to exit Setup.
Finish

Figure 1 – The final step in a successful C-Bus Toolkit software installation

2.1 Starting the Program

To start the C-Bus® Toolkit program click the Windows Start button, navigate to the C-Bus Toolkit folder and click the C-Bus Toolkit icon. The default C-Bus Toolkit folder location is shown in (Figure 2). The C-Bus Toolkit start up screen is shown in (Figure 3).

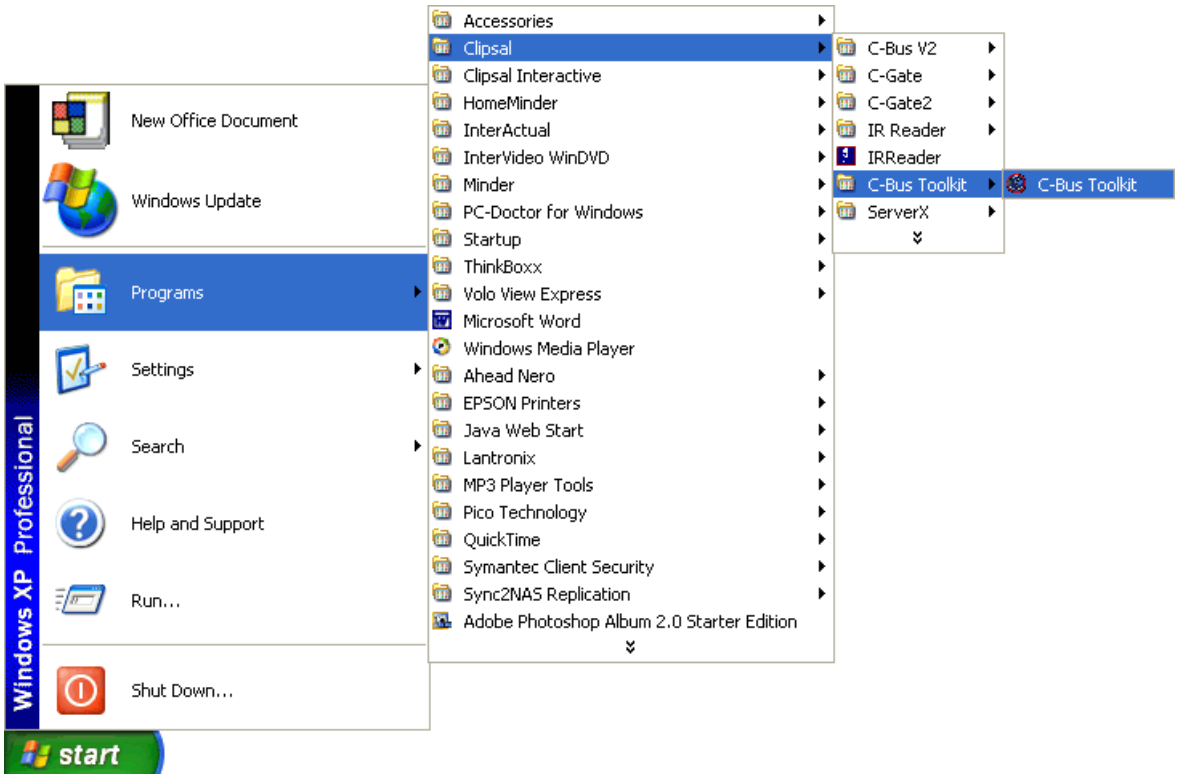


Figure 2 – Starting C-Bus Toolkit

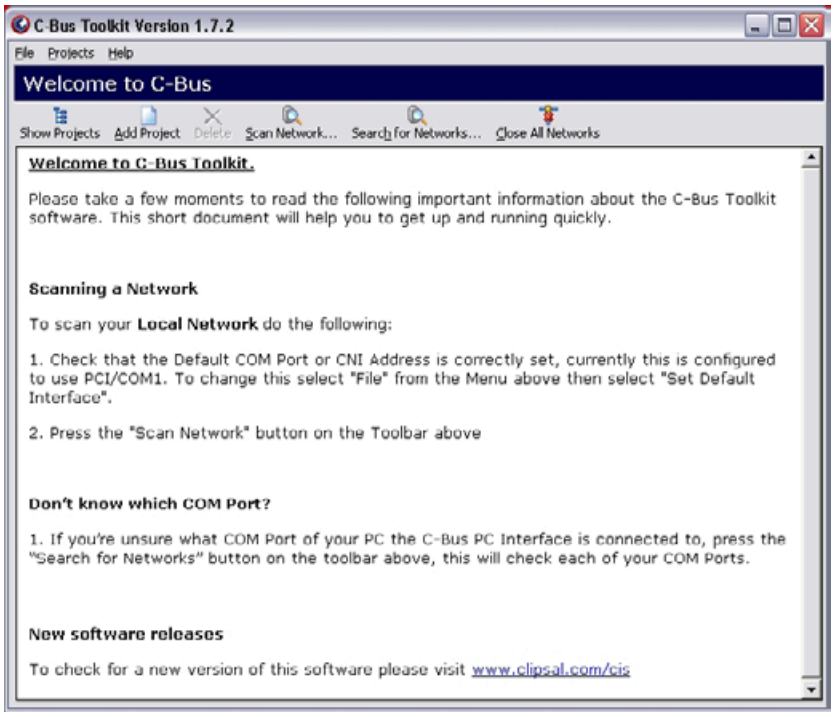

C-Bus Toolkit Version 1.7.2
File Projects Help
Welcome to C-Bus
Show Projects
Add Project
Delete
Scan Network...
Search for Networks...
Close All Networks
Welcome to C-Bus Toolkit.
Please take a few moments to read the following important information about the C-Bus Toolkit software. This short document will help you to get up and running quickly.
Scanning a Network
To scan your Local Network do the following:
1. Check that the Default COM Port or CNI Address is correctly set, currently this is configured to use PCI/COM1. To change this select "File" from the Menu above then select "Set Default Interface".
2. Press the "Scan Network" button on the Toolbar above
Don't know which COM Port?
1. If you're unsure what COM Port of your PC the C-Bus PC Interface is connected to, press the "Search for Networks" button on the toolbar above, this will check each of your COM Ports.
New software releases
To check for a new version of this software please visit www.clipsal.com/cis

Figure 3 – The initial C-Bus® Toolkit screen

3.0 The Menu

3.1.1 Connect to Local Repository

This connects to the Toolkit database and C-Bus Networks on the local PC. This automatically occurs when starting the Toolkit software.

3.1.2 Disconnect Project Repository

Use this to disconnect from the local or remote database and C-Bus Network so you can connect to another location.

3.1.3 Connect to Remote Repository

Use this option to connect to a database and C-Bus Networks associated with Toolkit, HomeGate, HomeSpeak or Schedule Plus on a PC in a remote location. You need to disconnect the local connection before you can connect remotely. You will be prompted to enter either the IP Address or the Host Name of the remote database and C-Bus Network (Figure 4). The first time you attempt to connect you must type in a Site Name. This does not have to be the site's actual name, simply a name you use to identify the site.

Figure 4 – Enter the IP Address or Host Name

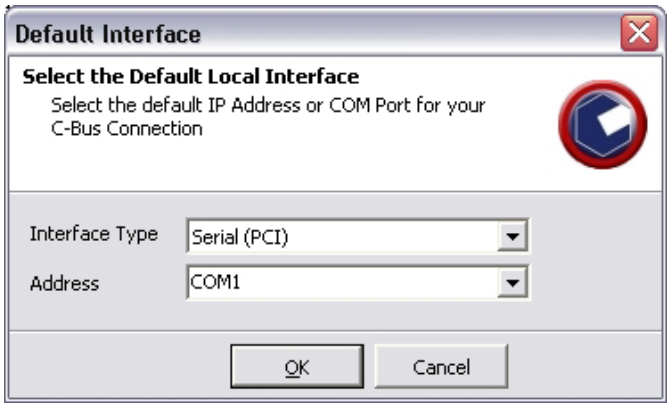


Figure 5 – Selecting the default interface used to connect to a C-Bus Network

3.1.4 Set Default Interface

This allows you to specify which method to use to connect to a local C-Bus® Network. Select either a Serial (PCI) or IP Address (CNI) via the panel shown in Figure 5. If you select PCI, you must also select a serial (COM) port address. If you select CNI, you must provide an IP address and port number.

3.1.5 Preferences

Use the Preferences panel (Figure 6 and Figure 7) to confiy gure various features of the C-Bus® Toolkit. The options are described in Table 1 and Table 2.

Features Tab

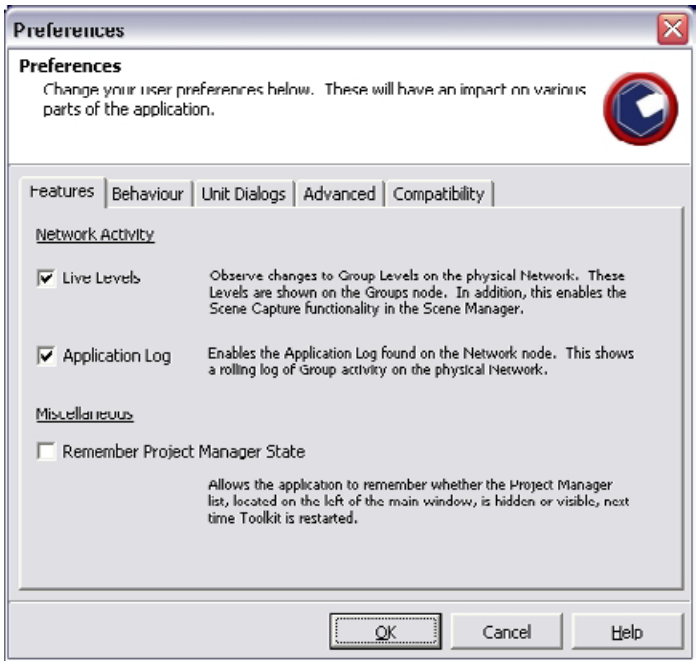

Preferences
Preferences
Change your user preferences below. These will have an impact on various parts of the application.
Features
Behaviour
Unit Dialogs
Advanced
Compatibility
Network Activity
Live Levels
Observe changes to Group Levels on the physical Network. These Levels are shown on the Groups node. In addition, this enables the Scene Capture functionality in the Scene Manager.
Application Log
Enables the Application Log found on the Network node. This shows a rolling log of Group activity on the physical Network.
Miscellaneous
Remember Project Manager State
Allows the application to remember whether the Project Manager list, located on the left of the main window, is hidden or visible, next time Toolkit is restarted.
OK
Cancel
Help

Figure 6 – The Preferences panel (Features Tab)

Network Activity	Live Levels	Causes the C-Bus Toolkit to display the correct values of all Group Addresses in real time.
	Application Log	When enabled, the Toolkit records C-Bus events which it sees on the C-Bus Network. Events are stored in a separate Application Log under each Application in an open Network. The logs are erased when the Toolkit software is exited.
Automatically Launch Dialogs	In Database View: launch Unit dialog after a Unit is added	This causes the C-Bus Toolkit to open the GUI automatically, when a new unit is added to a database.
	In Unit Dialogs: launch Function dialogs when a Key Function is selected	This automatically presents any additional options when selecting the Dimmer and Timer Function types, when editing an input unit.

Table 1 – Features Tab options

Advanced Tab

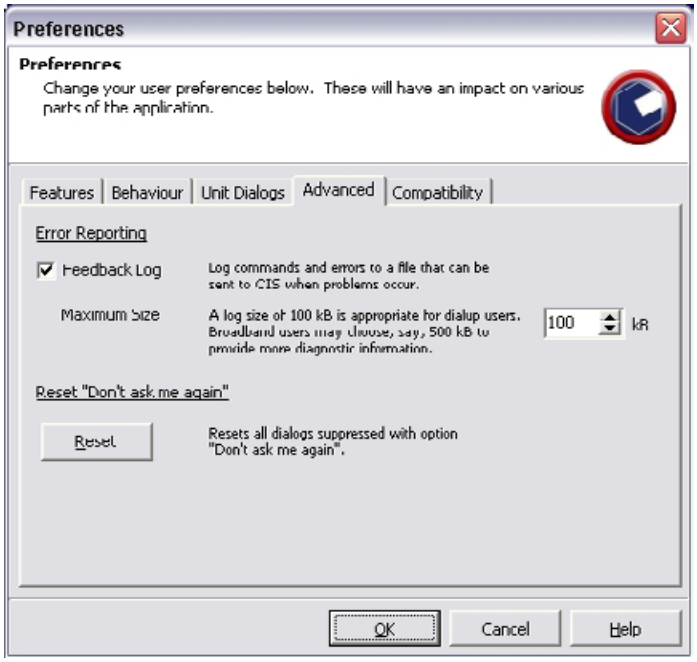

Preferences
Preferences
Change your user preferences below. These will have an impact on various parts of the application.
Features
Behaviour
Unit Dialogs
Advanced
Compatibility
Error Reporting
Feedback Log
Log commands and errors to a file that can be sent to CIS when problems occur.
Maximum Size
A log size of 100 kB is appropriate for dialup users. Broadband users may choose, say, 500 kB to provide more diagnostic information.
100
kB
Reset "Don't ask me again"
Reset
Resets all dialogs suppressed with option "Don't ask me again".
OK
Cancel
Help

Figure 7 - Advanced Tab options

Error Reporting	Feedback Log	Log commands and errors to a file that can be sent to CIS when problems occur.
	Maximum Size	A log size of 100kb is appropriate for dialup users. Broadband users may choose say 500kb to provide more diagnostic information.
C-Bus® Toolkit	Shutdown C-Gate Servers	Never leave C-Gate running after exiting C-Bus® Toolkit.Always: Close the C-Gate server when exiting C-Bus Toolkit.Ask: When you exit C-Bus Toolkit, ask you if you want to close the C-Gate server also.

Table 2 – Advanced Tab options

3.1.6 Restore Project Repository

This reloads backed up projects to the database on your local PC.

3.1.7 Backup Project Repository

Use this to back up all projects in the database on your local PC. The backup file is given a suffix of Backup Project Repository

Use this to back up all projects in the database on your local PC. The backup file is given a suffix of ".cbz" and placed on your Desktop.

3.1.8 Exit

Quit the C-Bus Toolkit.

3.2 Projects Menu

3.2.1 Add Project

Create a new empty C-Bus® project. You will be asked if you 'want to add a Network to the new project'. If you answer yes, you will be prompted to provide a name for the Network, and to specify the Network connection details.

3.2.2 Scan Network

Perform a live scan of the local Network using the default interface.

3.2.3 Search for Networks

Use this to find every interface which is connected to your PC via a PC Interface (PCI) or Computer Network Interface (CNI). Once an interface is detected, the C-Bus Toolkit allow you to scan the local Network.

3.2.4 Import Projects

Use this option to import projects from a C-Bus V2 software installation which exists in the default location on the same PC as the C-Bus Toolkit. Imported projects are converted to C-Bus Toolkit format.

3.2.5 Export Projects

Use this option to export projects from in a format compatible with the C-Bus V2 Installation Software. Projects are typically exported to C:\Clipsal\CBUSV2\PROJECTS on your PC.

3.2.6 Close All Networks

Closes all open Networks regardless of which project is selected.

3.2.7 Restore Project

Restores project from project backup files (*.cb3).

3.3 Help Menu

Provides information on which version of C-Bus Toolkit and C-Gate is used.

The help menu will be expanded in future releases of Toolkit software.

If required, the Clipsal Integrated Systems Technical Support line is available between the hours of 7:00AM and 6:00PM (GMT +9.30).

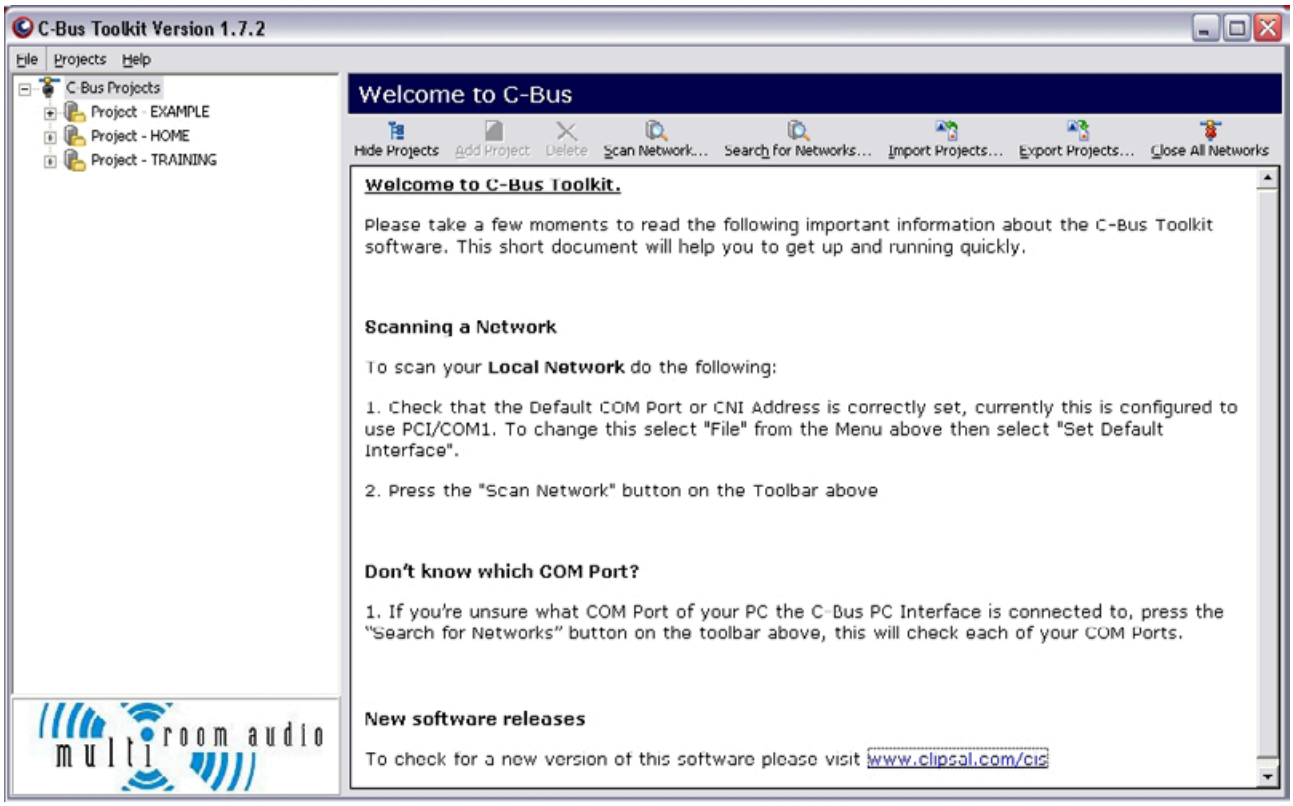
The C-Bus Forum is also a valuable source of information, available to all at no charge, where you can discuss products and programming issues with other C-Bus programmers. The web address is: http://www.cbusforums.com/

4.0 Using the Project Manager

NOTE: When you first run the C-Bus® Toolkit, you are presented with the “Welcome to C-Bus” window. To display the Project Manager, click the “Show Project Manager” icon.

The Toolkit’s Project Manager is a tree-like structure containing the Projects present in the connected database. Each Project is represented by a folder containing its Networks, Applications, Units and other information in a series of sub folders. Expand a folder by clicking the plus symbol to its left, or shrink it by clicking its minus symbol.

Whenever you select a folder in the Project Manager, a corresponding window appears to the right. This window displays details relevant to the selected folder, such as information for a selected Network or its Applications or Units. The Project Manager is hidden or displayed by clicking the “Hide Project Manager” or “Show Project Manager” icons in this window. Refer to (Figure 8).


C-Bus Toolkit Version 1.7.2
File
Projects
Help
C-Bus Projects
Project - EXAMPLE
Project - HOME
Project - TRAINING
Welcome to C-Bus
Hide Projects
Add Project
Delete
Scan Network...
Search for Networks...
Import Projects...
Export Projects...
Close All Networks
Welcome to C-Bus Toolkit.
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2. Press the "Scan Network" button on the Toolbar above
Don't know which COM Port?
1. If you're unsure what COM Port of your PC the C-Bus PC Interface is connected to, press the "Search for Networks" button on the toolbar above, this will check each of your COM Ports.
New software releases
To check for a new version of this software please visit www.clipsal.com/cis
multi room audio

Figure 8 – Project Manager

4.1 Project

When first installed, the C-Bus® Toolkit contains two example Projects; “CLIPSAL” and “home”. When a Project folder is selected, the Project window is displayed to the right of the Project Manager (Figure 9). Functional icons are provided at the top of the Project window. When clicked on, these perform the functions listed in Table 3.

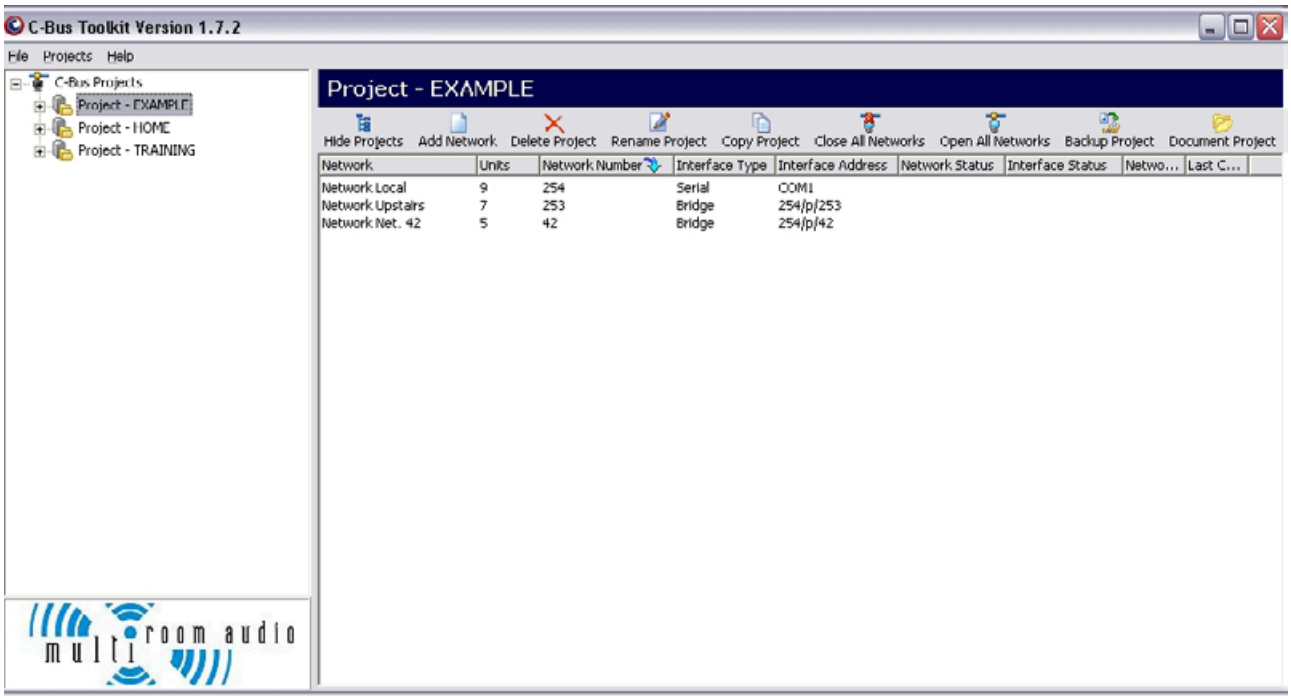


Figure 9 – The Project window is displayed when a Project folder is selected in the Project Manager

Icon	Function
Hide Project Manager	Hides the Project Manager, providing more room for the Project window
Add Network	Adds a new Network to the current Project. You are prompted to enter a name and Network connection details.
Delete Project	Deletes the selected Project.
Rename Project	Prompts you to enter a new name for the selected Project.
Copy Project	Creates a copy of the selected Project. You are prompted to type a name.
Close All Networks	Closes all open Networks in the selected Project.
Open All Networks	Attempts to open all Networks in the selected Project. The relevant Networks must be connected to the PC via C-Bus for this to be successful.
Backup Project	Creates a backup archive of the selected Project. The backup file is given a suffix of “.cb3” and placed on your Desktop.

Table 3 – Project window icons and their functions

4.2 Network

A Project may contain up to 255 Networks. When a Network is selected the Network window is displayed to the right of the Project Manager (Figure 10). Functional icons are provided at the top of the Network window. When clicked on, these perform the functions listed in Table 4.

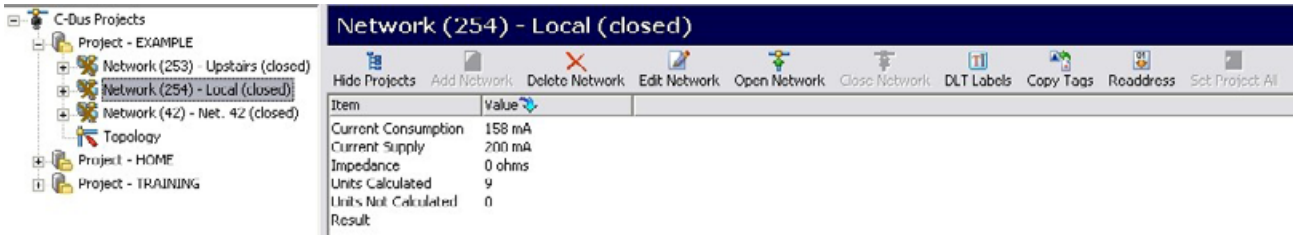


Figure 10 – The Network window is displayed when a Network folder is selected in the Project Manager

Icon	Function
Hide Project Manager	Hides the Project Manager, providing more room for the Network window.
Delete Network	Deletes the selected Network.
Edit Network	Allows you to change the name and connection details of the selected Network.
Edit Languages	Allows you to create and edit textual and graphical labels which are associated with particular Groups. These can be transferred to DLT input units, to be displayed as customised labels.
Open Network	Attempts to open the selected Network. The Network must be connected to the PC via C-Bus® for this to be successful.
Close Network	Closes the selected Network if it is open.
Copy Tags	This imports Groups and their tags (names) into the selected Network. You are prompted to select a source Network from the same Project. Group tags in the selected Network will change to those used in the source Network.
Readdress	Prompts you to select a new (unused) Network Address for the selected Network.
Set Project All	Saves the Project name to all units, which have been scanned in using the “Scan Network” icon in the “Units on Network” window.

Table 4 – Network window icons and their functions

4.3 Applications

The Applications folder contains separate folders for each Application Address that exists in the current Network. When selected, the Applications window is displayed to the right of the Project Manager (Figure 11). Functional icons are provided at the top of the Applications window. When clicked on, these perform the functions listed in Table 5.

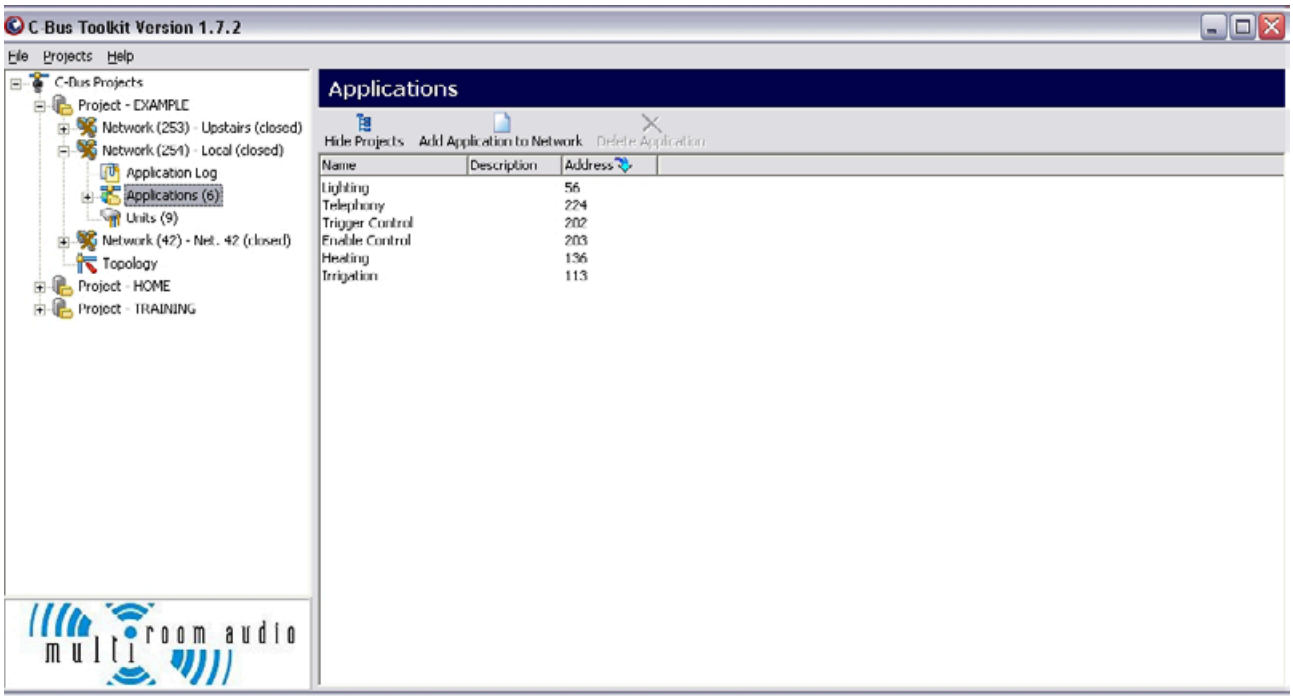


Figure 11 – The Applications window is displayed when the Applications folder is selected in the Project Manager

Icon	Function
Hide Project Manager	Hides the Project Manager, providing more room for the Applications window.
Add Application to Network	Adds a new Application to the current Network. You are prompted to enter an Application Address, Name and Description.

Table 5 – Applications window icons and their functions

4.4 Individual Application Addresses

Many individual Application Addresses (such as Enable Control, Heating and Lighting) may exist in a Network. Each available Application is represented by a folder within the Applications folder. When selected, a corresponding Application window is displayed to the right of the Project Manager (Figure 12). Functional icons are provided at the top of the Application window. When clicked on, these perform the functions listed in Table 6.

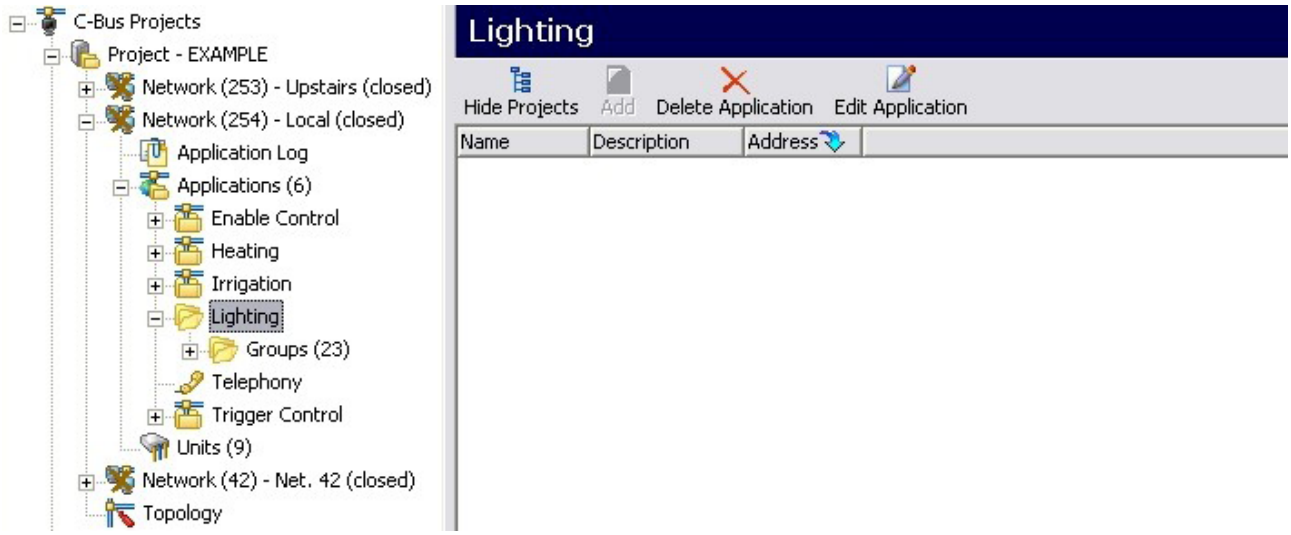


Figure 12 –An Application window is displayed when an Application folder is selected in the Project Manager

Icon	Function
Hide Project Manager	Hides the Project Manager, providing more room for the Application window.
Delete Application	Deletes the selected Application.
Edit Application	Allows you to view the Application Address, or change the name and description.

Table 6 – Application window icons and their functions

Each Application folder contains an Application Log. When the “Application Log” option is enabled in Preferences (File Menu), Toolkit records C-Bus® events that it sees on the C-Bus Network. The events are stored in the Application Log. Logs are erased when the Toolkit software is exited.

4.5 Groups

The Groups folder displays individual Group Addresses that exist in the current Application. When selected, the Groups window is displayed to the right of the Project Manager (Figure 13). Functional icons are provided at the top of the Groups window. When clicked on, these perform the functions listed in Table 7.

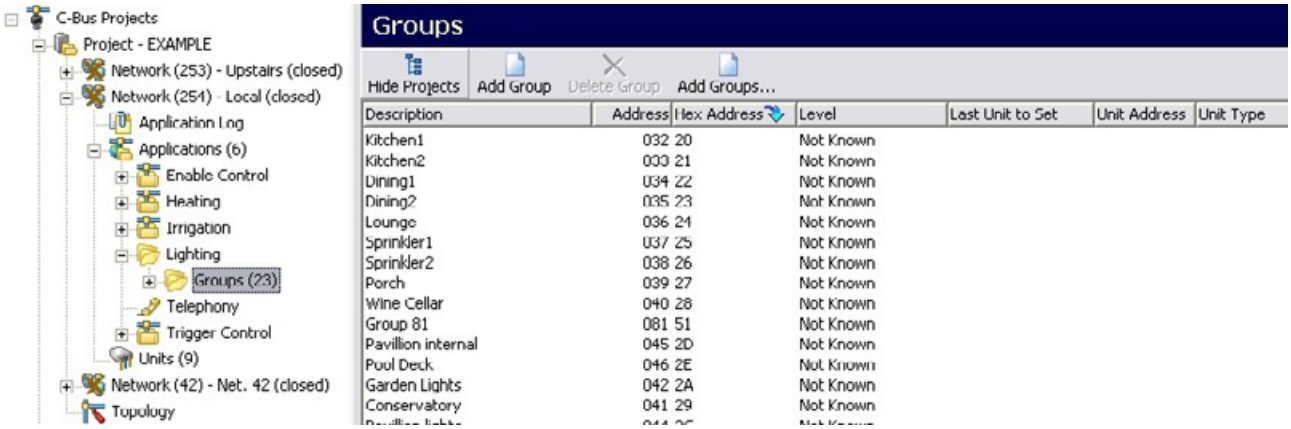


Figure 13 – The Groups window is displayed when the Groups folder is selected in the Project Manager

Icon	Function
Hide Project Manager	Hides the Project Manager, providing more room for the Groups window.
Add Group	Adds a new Group to the current Application. You are prompted to enter the Group Address and description (tag).

Table 7 – Groups window icons and their functionS

4.6 Individual Group Addresses

Many individual Group Addresses (such as Kitchen, Dining Room or Group 12) may exist in an Application. Icons within the Groups folder represent each available Group. When selected, a corresponding Group (Details) window is displayed to the right of the Project Manager (Figure 14). Functional icons are provided at the top of the Group (Details) window. When clicked on, these perform the functions listed in Table 8.

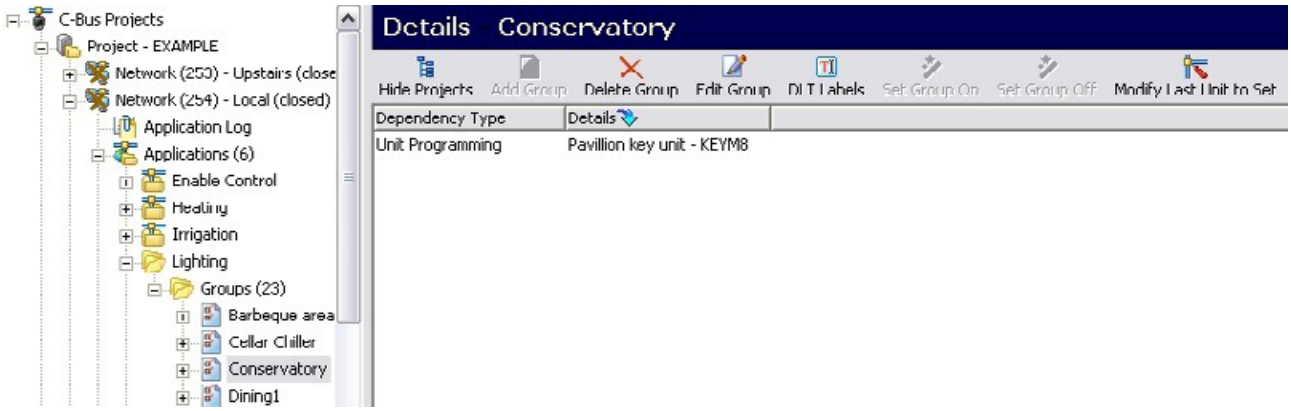


Figure 14 – The Group (Details) window is displayed when a Group is selected in the Project Manager

Icon	Function
Hide Projects	Hides the Project Manager, providing more room for the Group (Details) window.
Delete Group	Deletes the selected Group.
Edit Group	Allows you to change the Group's Description (tag).
DLT Labels	Allows you to assign a textual or iconic (pictorial) label to the Group Address. This can be sent transferred to Dynamic Labelling Technology (DLT) input units.
Set Group On	Sets the level or selector of the selected Group Address to a value of 255. This function only works when the Network is open, a C-Bus® Network is connected and "Scan Network" has been performed in the "Units on Network" window. Note that a selector may be referred to by the Toolkit software as a value or action selector.
Set Group Off	Sets the level or selector of the selected Group Address to a value of 000. This function only works when the Network is open, a C-Bus Network is connected and "Scan Network" has been performed in the "Units on Network" window.
Modify Last Unit to Set	Allows you to edit the last unit to use the selected Group Address (if known).

Table 8 – Group (Details) window icons and their functions

4.7 Units

This is where the physical C-Bus® units can be viewed and configured. When selected, the “Units in Database” window is displayed to the right of the Project Manager. In this window you can add C-Bus units to a project before they are installed or connected. You can configure the units, which can later be transferred to physical units when a connection to C-Bus is established.

When the Network is open, a “Units on Network” window is displayed under the “Units in Database” window. In this window you can scan a physical C-Bus installation which is connected to your PC, and view the units live on the C-Bus Network.

These windows are displayed in (Figure 15). Functional icons are provided at the top of each of these windows. When clicked on, these perform the functions listed in Table 9 and Table 10.

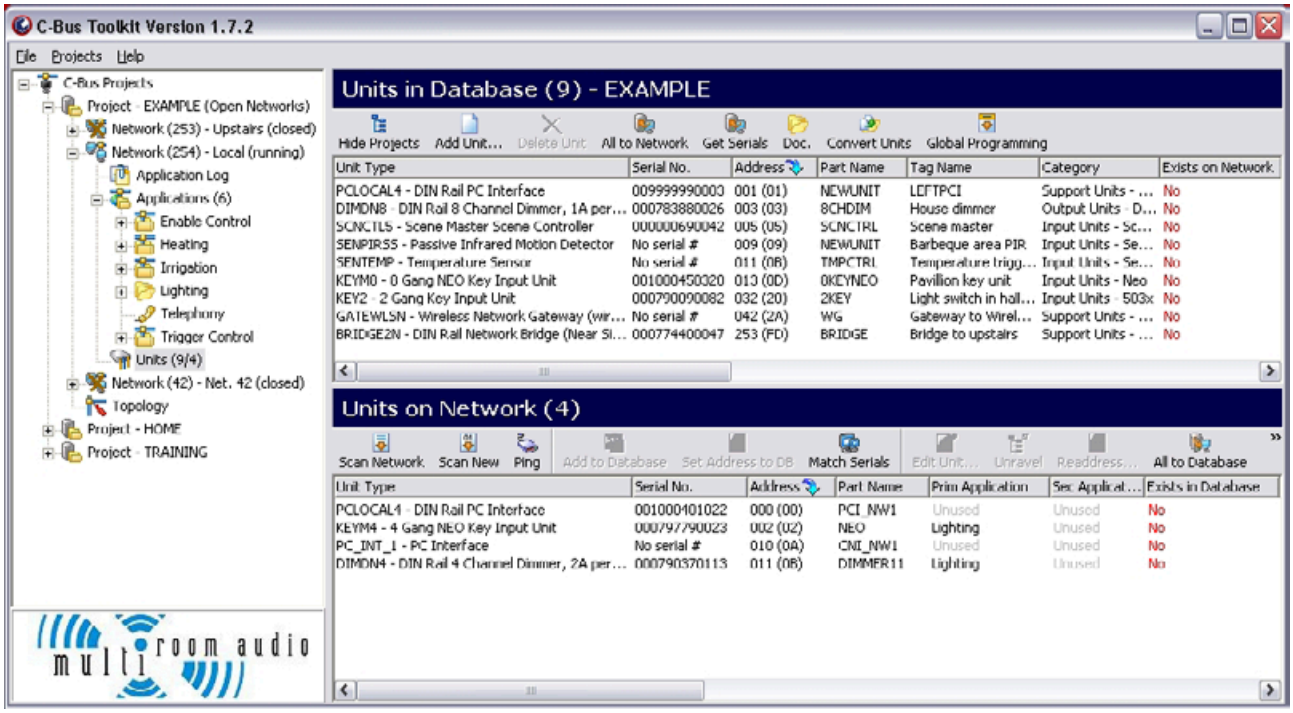

C-Bus Toolkit Version 1.7.2
File Projects Help
C-Bus Projects
Project - EXAMPLE (Open Networks)
Network (253) - Upstairs (closed)
Network (254) - Local (running)
Application Log
Applications (6)
Enable Control
Heating
Irrigation
Lighting
Telephony
Trigger Control
Units (9/4)
Network (42) - Net. 42 (closed)
Topology
Project - HOME
Project - TRAINING
Units in Database (9) - EXAMPLE
Hide Projects
Add Unit...
Delete Unit
All to Network
Get Serials
Doc.
Convert Units
Global Programming
Unit Type
Serial No.
Address
Part Name
Tag Name
Category
Exists on Network
PCLOCAL4 - DIN Rail PC Interface 009999990003 001 (01) NEWUNIT LEFTPCI Support Units - ... No
DIMDN8 - DIN Rail 8 Channel Dimmer, 1A per... 000783880026 003 (03) 8CHDIM House dimmer Output Units - D... No
SCNCTLS - Scene Master Scene Controller 000000690042 005 (05) SCNCTRL Scene master Input Units - Sc... No
SENPIRSS - Passive Infrared Motion Detector No serial # 009 (09) NEWUNIT Barbeque area PIR Input Units - Se... No
SENTEMP - Temperature Sensor No serial # 011 (0B) TMPCTRL Temperature trigg... Input Units - Se... No
KEYM0 - 0 Gang NEO Key Input Unit 001000450020 013 (0D) 0KEYNEO Pavillion key unit Input Units - Neo No
KEY2 - 2 Gang Key Input Unit 000790090082 032 (20) 2KEY Light switch in hall... Input Units - 503x No
GATEWLSN - Wireless Network Gateway (wir... No serial # 042 (2A) WG Gateway to Wirel... Support Units - ... No
BRIDGE2N - DIN Rail Network Bridge (Near Si... 000774400047 253 (FD) BRIDGE Bridge to upstairs Support Units - ... No
Units on Network (4)
Scan Network
Scan New
Ping
Add to Database
Set Address to DB
Match Serials
Edit Unit...
Unravel
Readdress...
All to Database
Unit Type
Serial No.
Address
Part Name
Prim Application
Sec Applicat...
Exists in Database
PCLOCAL4 - DIN Rail PC Interface 001000101022 000 (00) PCI_NW1 Unused Unused No
KEYM4 - 4 Gang NEO Key Input Unit 000797790023 002 (02) NEO Lighting Unused No
PC_INT_1 - PC Interface No serial # 010 (0A) CNI_NW1 Unused Unused No
DIMDN4 - DIN Rail 4 Channel Dimmer, 2A per... 000790370113 011 (0B) DIMMER11 Lighting Unused No
multi room audio

Figure 15 - Units is selected in the Project Manager and the Network is open.

Icon	Function
Hide Project Manager	Hides the Project Manager, providing more room for the Units windows.
Add Unit	Adds a new unit to the database. You are prompted to select a unit from a list of known unit types. You can then enter a Serial Number, Unit Address and Name (tag) for the unit.
Delete Unit	Deletes a unit from the database.
All to Network	Transfers the configureuration data of all units in the Database to units of the same type with the same Unit Address on the Network.
Get Serials	Transfers serial numbers of all units on the Network to units of the same type and Unit Address in the Database.
Doc.	Creates a file listing each unit in the database including its Part Name, Unit Type, and Unit, Application, Area and Group Addresses. The data is written in ASCII Comma Separated Value (CSV) format, suitable for use in a spreadsheet.
Edit Unit	Presents you with a panel allowing you to configure the unit's Application Address, Group Address and many other parameters (depending on the unit type).
Unit -> Network	Transfers the configureuration data of the selected unit in the Database to a unit of the same type with the same Unit Address on the Network.
Copy Unit	Make a copy of the selected unit.
Readdress	Prompts you to select a new Unit Address for the selected unit.
Reinstall	Transfers the configureuration data from a unit on the Network with a Unit Address of 255, to the selected unit of the same type in the Database. It is not necessary to use the "Scan Network" function in the "Units on Network" window first.

Table 9 – Units in Database window icon functions

Icon	Function
Scan Network	Performs a complete scan of a connected C-Bus® Network. If multiple units have the same Unit Address, you will be asked if you want to resolve the Unit Address conflict (unravel). Scanned units are loaded into the "Units on Network" window.
Scan New	Performs a short scan of a connected C-Bus Network to search for units with a Unit Address that is not present in the "Units on Network" window. Units with a duplicate Unit Address will not be detected.
Ping	Checks the C-Bus Network to see if the units present in "Units on Network" exist.
Add Unit -> DB	Adds the selected unit on the Network to the Database (only if the Database has no unit with the same Unit Address or serial number).
Set Addr. -> DB	Changes the Unit Address of the selected unit to that of a compatible unit in the Database.
Match Serials	Changes the Unit Addresses of units on the Network to the Unit Addresses of units in the database which have the same serial number. You are prompted with a list of units so you can select which Addresses to change.
Readdress	Prompts you to select a new Unit Address for the selected unit.
Unravel	Checks the C-Bus Network for multiple units with the same Unit Address. If duplicates are found you will be asked if you want to resolve the conflict (unravel).
All Units -> DB	Transfers the configureuration data of all units on the Network to units of the same type with the same Unit Address in the Database. Any units not present in the Database will be added.
Unit -> DB	Transfers the configureuration data of the selected unit to a unit of the same type with the same Unit Address in the Database.
Make Network(When bridge selected)	Creates, configures and opens a new Network corresponding to the other side of the selected bridge or gateway.

Table 10 – Units on Network window icon functions

4.8 Topology

When Topology is selected the Topology window is displayed to the right of the Project Manager (Figure 16). Functional icons are provided at the top of the Topology window. When clicked on, these perform the functions listed in Table 11.

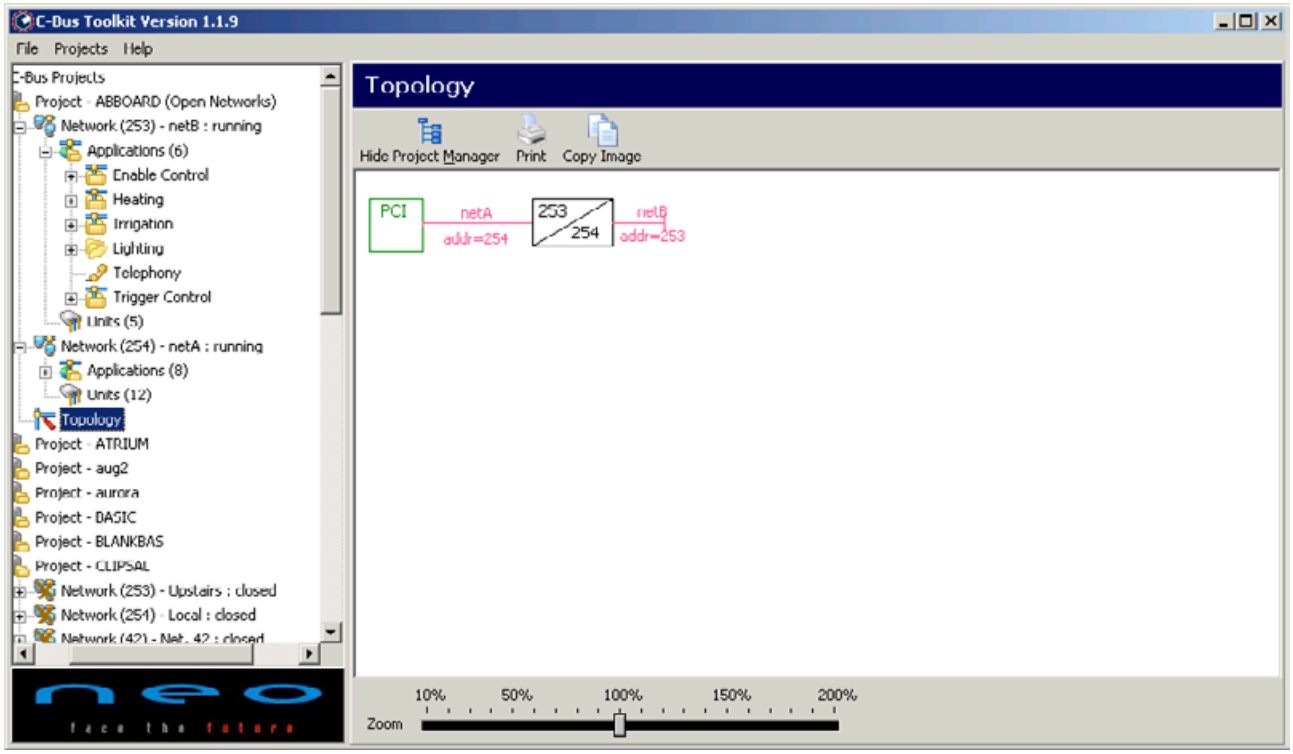


Figure 16 – The Topology window is displayed when Topology is selected in the Project Manager

Icon	Function
Hide Project Manager	Hides the Project Manager, providing more room for the Topology window.
Print	Prints the C-Bus® topology map to the default printer.
Copy	Copies the C-Bus topology map to the clipboard as a raster (bitmap) image. It can then be pasted into other software applications.

Table 11 – Topology window icons and their functions

5.0 Example: Scanning a New C-Bus® Network

This example demonstrates how to scan a new C-Bus® Network.

1. Open the C-Bus Toolkit to display the screen in (Figure 17).

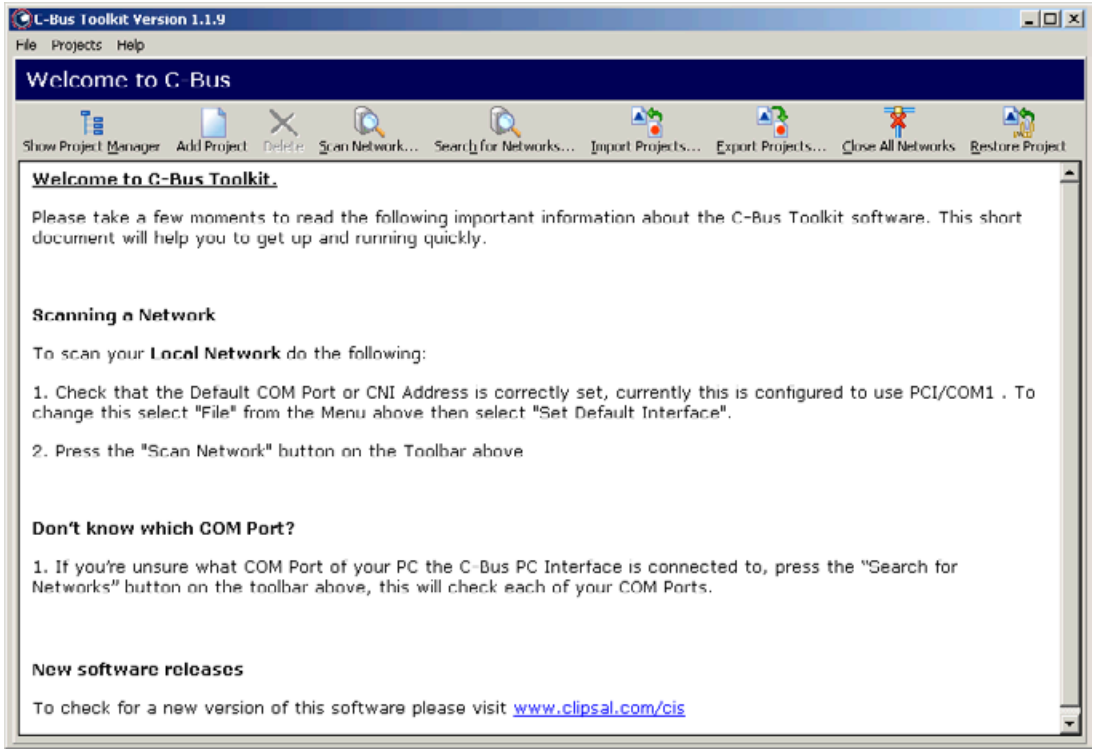

C-Bus Toolkit Version 1.1.9
File Projects Help
Welcome to C-Bus
Show Project Manager
Add Project
Delete
Scan Network...
Search for Networks...
Import Projects...
Export Projects...
Close All Networks
Restore Project
Welcome to C-Bus Toolkit.
Please take a few moments to read the following important information about the C-Bus Toolkit software. This short document will help you to get up and running quickly.
Scanning a Network
To scan your Local Network do the following:
1. Check that the Default COM Port or CNI Address is correctly set, currently this is configured to use PCI/COM1 . To change this select "File" from the Menu above then select "Set Default Interface".
2. Press the "Scan Network" button on the Toolbar above
Don't know which COM Port?
1. If you're unsure what COM Port of your PC the C-Bus PC Interface is connected to, press the "Search for Networks" button on the toolbar above, this will check each of your COM Ports.
New software releases
To check for a new version of this software please visit www.clipsal.com/cis

Figure 17 - C-Bus Toolkit

2. Select “Set Default Interface” from the File menu (Figure 18).

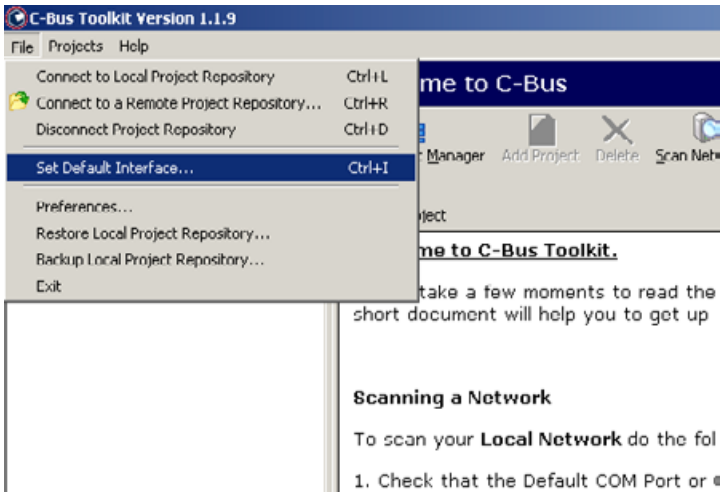

C-Bus Toolkit Version 1.1.9
File Projects Help
Connect to Local Project Repository Ctrl+L
Connect to a Remote Project Repository... Ctrl+R
Disconnect Project Repository Ctrl+D
Set Default Interface... Ctrl+I
Preferences...
Restore Local Project Repository...
Backup Local Project Repository...
Exit
me to C-Bus
Manager
Add Project
Delete
me to C-Bus Toolkit.
take a few moments to read the
short document will help you to get up
Scanning a Network
To scan your Local Network do the fol
1. Check that the Default COM Port or

Figure 18 - Setting default interface

3. You need to select an interface through which to communicate between your PC and the C-Bus® Network (Figure 19). Select either:
   - Serial (PCI) for use with a PC Interface, and select a COM port
   - IP Address (CNI) for use with a Computer Network Interface, and enter an IP address and port.

NOTE: Before a new CNI can be used to communicate with a C-Bus Network, it must be programmed with an IP Address using the Lantronix Device Installer software. This is available from the downloads section of this website: http://www.clipsal.com/cis

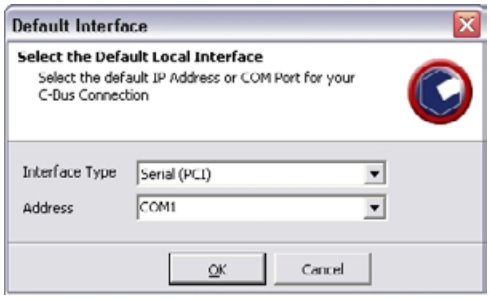


Figure 19 - Default Interface

4. Click “Scan Network”

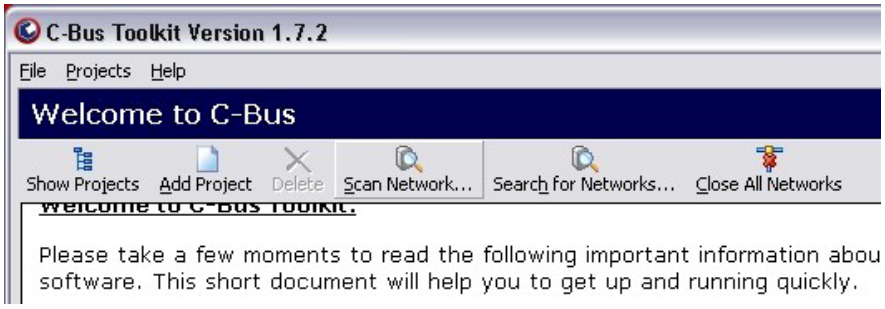

C-Bus Toolkit Version 1.7.2
File Projects Help
Welcome to C-Bus
Show Projects
Add Project
Delete
Scan Network...
Search for Networks...
Close All Networks
Please take a few moments to read the following important information abou
software. This short document will help you to get up and running quickly.

Figure 20 - Scan Network Button

5. The software searches for a C-Bus Network using the interface selected in step 3.

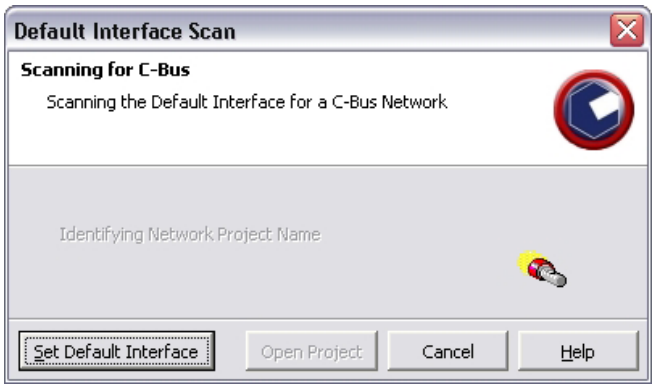


Figure 21 - Default Interface Scan

6. Once the C-Bus® Toolkit finds a C-Bus Network, it retrieves the Project Name from the PCI or CNI. The default Project Name for new C-Bus units is CLIPSAL. You are then presented with three options (Figure 22). You can choose to either:
   - Open or create the Project (using the Project Name retrieved)
   - Select from a list of existing Toolkit Projects
   - Create a Project with a different name.

Figure 22 - Open Project

7. For this example, select “Create a Project with a different name”. You are then prompted to enter a new Project Name (Figure 23). Type “EXAMPLE”, then click OK.

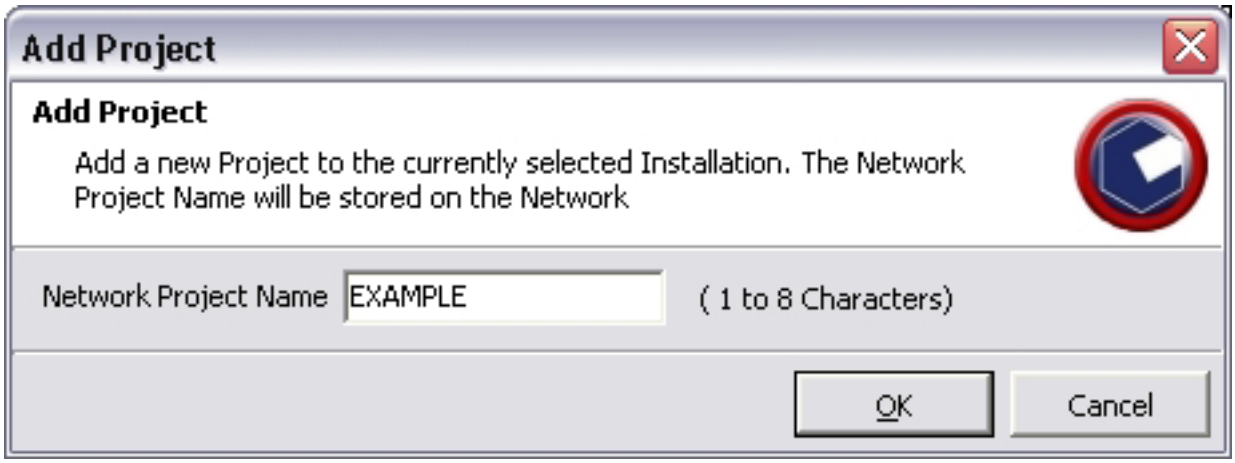

Add Project
Add Project
Add a new Project to the currently selected Installation. The Network Project Name will be stored on the Network
Network Project Name
EXAMPLE
(1 to 8 Characters)
OK
Cancel

Figure 23 - Add new project

8. The software continues to scan the C-Bus® Network, identifying C-Bus units and adding them to the specified Project. If it finds any Unit Address conflicts (multiple units with the same Unit Address), the software asks you if you want to unravel the units (automatically reassign Unit Addresses to resolve the conflicts). If this is the case, choose Yes to unravel.

Units are added to the “Units on Network” window of the Project, shown in (Figure 24).

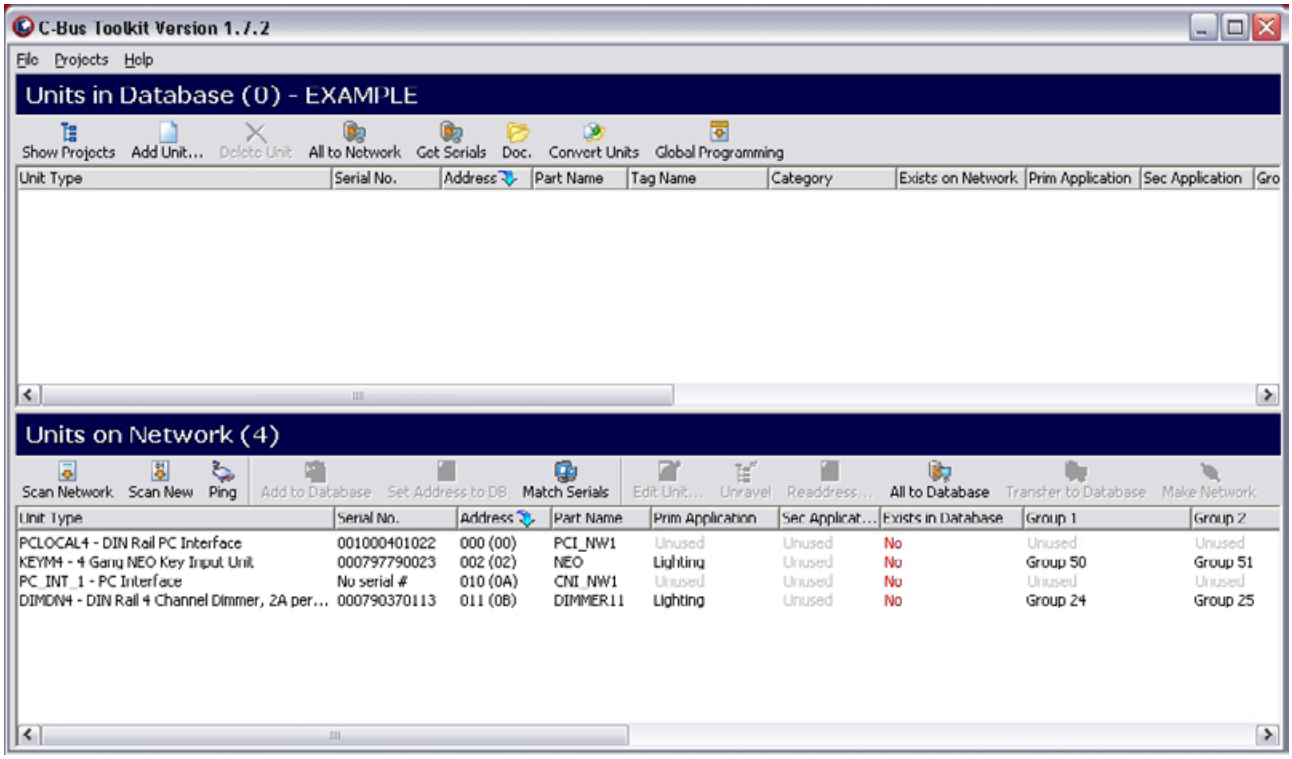

C-Bus Toolkit Version 1.7.2
File Projects Help
Units in Database (0) - EXAMPLE
Show Projects Add Unit... Delete Unit All to Network Get Serials Doc. Convert Units Global Programming
Unit Type Serial No. Address Part Name Tag Name Category Exists on Network Prim Application Sec Application Gro
Units on Network (4)
Scan Network Scan New Ping Add to Database Set Address to DB Match Serials Edit Unit... Unravel Readdress... All to Database Transfer to Database Make Network
Unit Type Serial No. Address Part Name Prim Application Sec Applicat... Exists in Database Group 1 Group 2
PCLOCAL4 - DIN Rail PC Interface 001000401022 000 (00) PCI_NW1 Unused Unused No Unused Unused
KEYM4 - 4 Gang NEO Key Input Unit 000797790023 002 (02) NEO Lighting Unused No Group 50 Group 51
PC_INT_1 - PC Interface No serial # 010 (0A) CNI_NW1 Unused Unused No Unused Unused
DIMDN4 - DIN Rail 4 Channel Dimmer, 2A per... 000790370113 011 (0B) DIMMER11 Lighting Unused No Group 24 Group 25

Figure 24 - Scanned Network

9. It is good practice to keep Databases of Networks that you work with. This has a number of benefits:
   - The Project can be customised without the Network being connected.
   - Unit programming can be quickly accomplished when replacing Units.
   - Working with units in the Database is faster than working with units on the Network.

To add the units on the Network to the Database, click the “All Units -> DB” icon. You are presented with the Transfer Units panel (Figure 25). Click the Transfer button. Units in the 'Units on Network' window will be copied to the “Units in Database” window. This may take a minute or two.

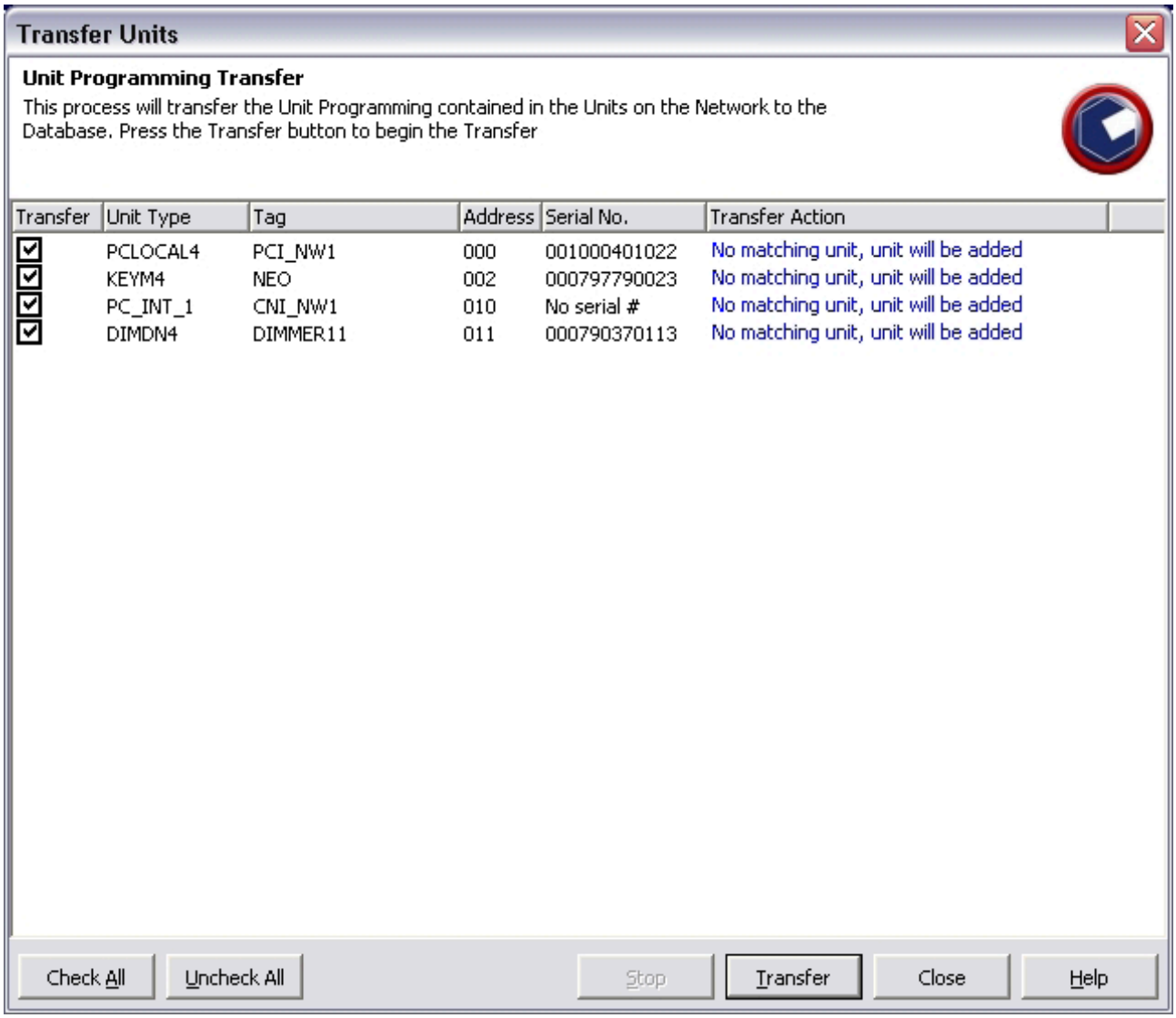


Figure 25 - Transfer Units

10. The Network and database views will now match as shown in (Figure 26). The C-Bus® Network is ready to be programmed.

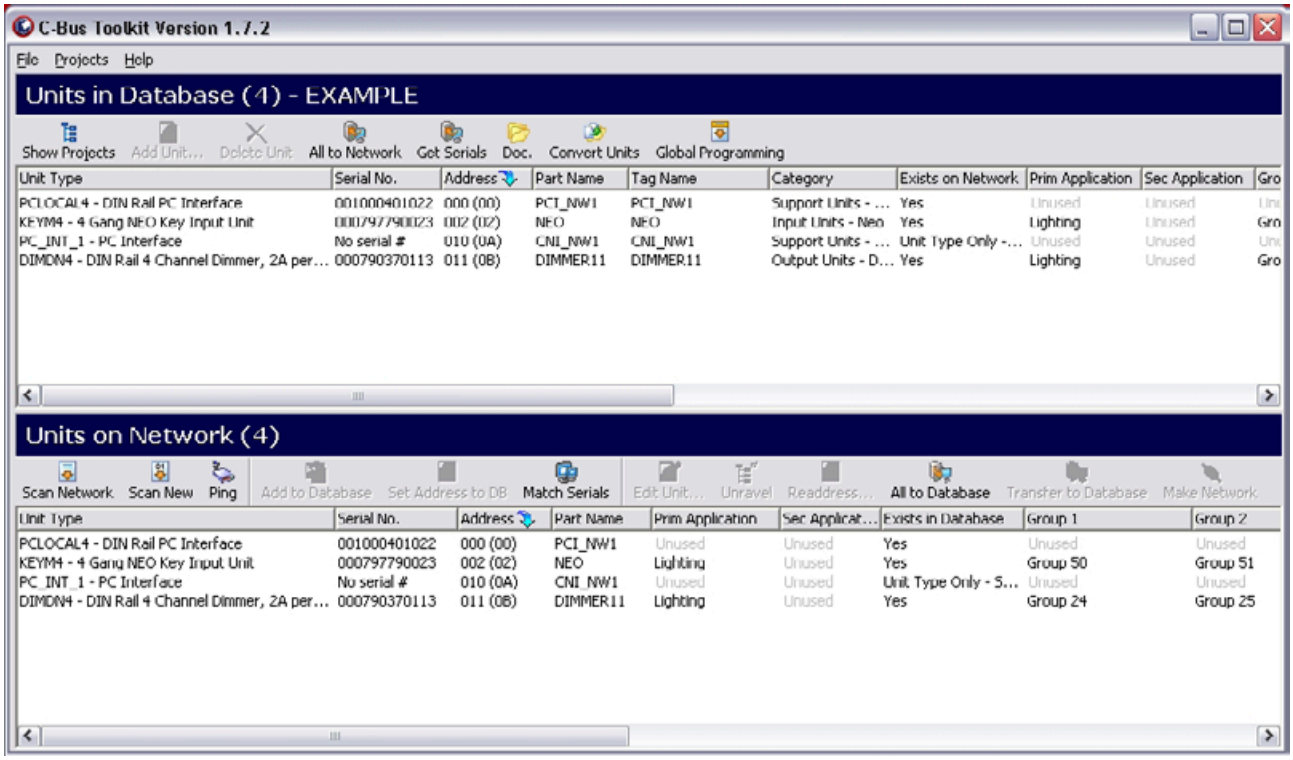
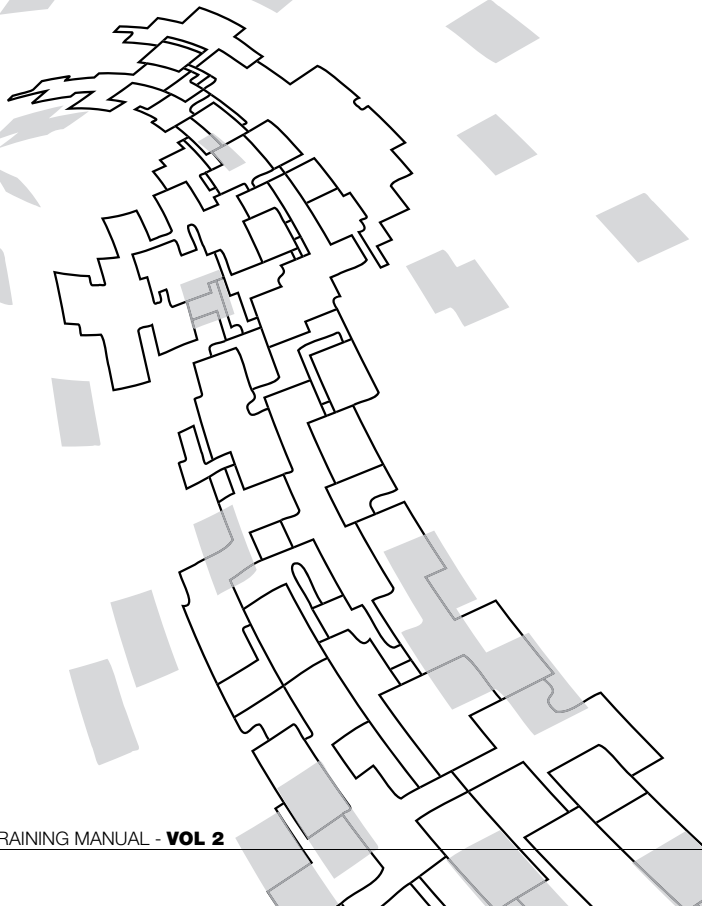

C-Bus Toolkit Version 1.7.2
File Projects Help
Units in Database (4) - EXAMPLE
Show Projects Add Unit... Delete Unit All to Network Get Serials Doc. Convert Units Global Programming
Unit Type Serial No. Address Part Name Tag Name Category Exists on Network Prim Application Sec Application
PCLOCAL4 - DIN Rail PC Interface 001000401022 000 (00) PCI_NW1 PCI_NW1 Support Units - ... Yes Unused Unused
KEYM4 - 4 Gang NEO Key Input Unit 000797790023 002 (02) NEO NEO Input Units - Neo Yes Lighting Unused
PC_INT_1 - PC Interface No serial # 010 (0A) CNI_NW1 CNI_NW1 Support Units - ... Unit Type Only -... Unused Unused
DIMDN4 - DIN Rail 4 Channel Dimmer, 2A per... 000790370113 011 (0B) DIMMER11 DIMMER11 Output Units - D... Yes Lighting Unused
Units on Network (4)
Scan Network Scan New Ping Add to Database Set Address to DB Match Serials Edit Unit... Unravel Readdress... All to Database Transfer to Database Make Network
Unit Type Serial No. Address Part Name Prim Application Sec Applicat... Exists in Database Group 1 Group 2
PCLOCAL4 - DIN Rail PC Interface 001000401022 000 (00) PCI_NW1 Unused Unused Yes Unused Unused
KEYM4 - 4 Gang NEO Key Input Unit 000797790023 002 (02) NEO Lighting Unused Yes Group 50 Group 51
PC_INT_1 - PC Interface No serial # 010 (0A) CNI_NW1 Unused Unused Unit Type Only - S... Unused Unused
DIMDN4 - DIN Rail 4 Channel Dimmer, 2A per... 000790370113 011 (0B) DIMMER11 Lighting Unused Yes Group 24 Group 25

Figure 26 - Matching Database and Network

Volume 2B
Basic Programming



Scope

This manual aims to provide an installer with the basic skills needed to program and use C-Bus®. A fundamental technical background is required.

The manual includes basic programming information for C-Bus:

- Voltage free relays (a common output unit)
- Wall switches
- PE cell light level sensors
- PIR occupancy sensors.

It is an ideal preparation before attending the C-Bus Basic Training Course.

Learning Outcomes

By the end of this module, you should have an understanding of the basic programming options for a:

- C-Bus L5512 RVF 12 Channel Voltage Free Relay
- Standard C-Bus Wall Switch
- C-Bus Light Level Sensor
- C-Bus PIR Occupancy Sensor.

1.0 Basic Learn Mode

The C-Bus® 2 system features a mode, called Learn Mode, which allows Units on a C Bus Network to listen to each other and learn what they need to do by simple button presses on the Units.

To identify which are capable of entering Learn Mode check:

- Any label indicating C-Bus2
- Purple coloured case on output units.
- Orange LED's on the input units.

The source of this new functionality is the ability to assign a load, such as a light, with a controller, such as a key input unit, by touching the two units one after the other. This is done while in a mode called "Learn Mode", so named because the C Bus Network can now learn what the user wants to do.

NOTE: For safety reasons Learn Mode can be disabled from the C-Bus Installation Software to protect the programming of the Network.

1.0.1 Entering and Exiting Learn Mode

1. Find any Learn Mode output unit.
2. Press and hold down any of the Quick Toggle buttons on any output units for 10 seconds. The Unit and C-Bus LED's will then begin to flash alternately.

   The "Unit" and "C-Bus®" indicators may initially flash together for up to 20 seconds before flashing alternately. Various Network parameters are initialised during this.
3. On any of the output units, press and hold down any of the Quick Toggle buttons for 2 seconds.
4. The Unit and C-Bus LED should now be on solid.

The C-Bus clock will then have been successfully enabled on that particular output unit. If Learn Mode has not been exited successfully within 10 minutes, all Units will resume normal operation without storing any changes.

1.0.2 Selecting Output Channels

While in Learn Mode the Local Toggle buttons on Output Units can be pressed. The load will be switched on and the appropriate indicator will light up on the Output Unit. Multiple loads may be selected, across multiple Output Units. A mix of different Output Types (Dimmer and Relay) can also be selected if required.

1.0.3 Select the Output Channels required for operation.

Any previously programmed associations between Input and Output Units can be overwritten by a Learn operation. To ensure this doesn't happen, the programmer should only use each Output channel and each Input switch only ONCE when using Learn Mode.

1.0.4 Selecting Key Inputs

Once the loads have been selected, the user may choose one or more Input Units to control those loads.

Select the Input switch(es) required to control the loads.

If you make a mistake simply press the key again to deselect it, and remove it from the current Learn operation.

The simplest association is one involving a single switch and a single load. This would be achieved by entering Learn Mode, pressing a Local Toggle button on an Output Unit (waiting to see that the indicator lights), then pressing a key on an Input Unit and exiting Learn Mode.

1.1 Learn Mode Operations

C-Bus2 Learn Mode can be used to create a wide variety of flexible control configurations. Basic On/Off switches can be configured as well as Dimmer and Timer controls.

1.1.1 Relay and Dimmer Configurations

The type of control function assigned to the Input Units depends on whether you exit Learn Mode via a Relay or Dimmer Output Unit. For a switching control function, exit on a Relay Unit. For a dimmer function exit Learn Mode on a Dimmer Unit.

Key Function	**Exit Learn Mode Via:**
Switching operation	Relay Unit
Dimming operation	Dimmer Unit
Other operations (eg Timer, PIR, etc)	Relay OR Dimmer Unit

When the Output Unit used to exit Learn Mode is a relay then any keys included in a Learned switching (relay) operation will become on/off switches: press once and the load comes on, press again and the load goes off.

When the Output Unit used to exit Learn Mode is a dimmer then any keys selected for on/off functions in that Learn session will have dimming capability as well. Pressing the key (Short Press) toggles the light on or off. Pressing and holding the key down (Long Press) dims the light up or down with a 4 second ramp rate.

1.1.2 Multi-way Control Configurations

One or more loads may be controlled from one or multiple locations by various input devices. The example below allows for two-way switching or dimming controls to be configured.

1.1.3 One and Two Key Configurations

The single key On/Off configuration may be extended so that one key turns the load on and one turns it off. This is done during Learn Mode by pressing two adjacent keys on a single Input Unit.

After exiting from Learn Mode, the first key will turn the light on and when the second one is pressed it will turn off. When the 'on' key is pressed, the indicators on both keys will light since they are both associated with the same load. When the 'off' key is pressed, they will both go out.

Similarly, two key dimmer operation is used to separate up and down dimming operations. The first key will turn the load on (Short Press), or ramp the load upward when pressed and held (Long Press). The second key will turn the light off (Short Press), or ramp downward if pressed and held (Long Press).

If two keys are pressed on a particular input unit during the Learn operation, the last two keys pressed will become the 'On/Up' and 'Off/Down' keys respectively.

1.1.4 Area Address Switching

Area Address switching functions are commonly required, giving the ability to provide a Master On/Off switch that turns all lights and loads on or off simultaneously. This special case occurs when all Output channels on all Output Units are selected, and then one of those Output Units is used to exit Learn Mode.

It is assumed that the primary function of the key is intended to be as a Master Off switch. Hence a Short Press of the key will instantaneously turn off all selected lights and loads. A Long Press on the key will turn them all on.

Two Key Master switch configurations are permitted, with the first key assigned the Master On function, and the second key a Master Off function.

Master Switching controls should be configured last using Learn Mode.

To implement Area Address Switching:

- Set the Network into Learn Mode
- Turn on all Local Toggle buttons
- Select a C-Bus key to control the Area Address
- Exit Learn Mode.

You can still individually control each load for any Unit which has Master Switching implemented. The individual loads must be learned first, then the Master Switch configured.

Some temporary indicator state mis-matches may occur when Units are operated in this way; however these are normally resolved automatically in seconds.

1.1.5 Timer Configurations

The C-Bus2 system offers many timer options and some of these are available by means of Learn Mode. To create a timer switch once in Learn Mode, press and hold the key on an Input Unit.

The key indicator will come on after 1 second and then a series of double flashes will occur. Each double flash represents a time period of 5 minutes, with your selection being made when you release

the key. If the key is released before the first double flash, a 5 second timer will be set. This can be useful for testing purposes.

When a timer function has been selected the LED will give a single flash at 1 second intervals to ensure the user is aware of this function being selected for that key.

1.2 Super Learn Mode

Super Learn Mode is a powerful utility, allowing the user to:

- Reset Group Addresses on an Output Unit to $FF Unused
- Reset Area Addresses on an Output Unit to $FF Unused
- View the status of the Network Burden on an Output Unit
- Manually Enable or Disable the Network Burden on an Output Unit

1.2.1 Entering Super Learn Mode

A C-Bus2 Learn capable Output Unit is placed in Super Learn Mode by double clicking an Local Toggle button whilst that Unit is in Learn Mode.

All loads and associated indicators on that Unit will come on, and the “Unit” indicator will flash rapidly. The “C-Bus” indicator then shows the state of the Burden for that Unit. If the “C-Bus” indicator is on, then the Burden is enabled, if the “C-Bus” indicator is off, then the Burden is disabled.

1.2.2 Resetting To Defaults

Super Learn Mode may be used to clear Group Addresses from Output Units and restore other factory default settings. Upon exiting Super Learn Mode, all Group Addresses for the selected channels will be reset (cleared to $FF ‘Unused’).

When a Unit is placed in Super Learn Mode all channels on that Unit are selected by default, however individual channels may be de-selected as required. Only the selected channels will be cleared.

- If ALL channels on a C-Bus2 Output Unit are selected, then the Area Address and various other factory settings will be reset. If all channels on a Unit are not selected, the Area Address of that Unit will remain unchanged.
- Channels on all other output units may be selected (even though they are not in Super Learn Mode). So on exit of Super Learn Mode, all Quick Toggle Buttons that are on, will be set to default.

2.0 Voltage Free Relay

This section explains the basic programming of the C-Bus® L5512RVF 12 Channel Voltage Free Relay. C-Bus output units contain many common elements. These include:

- Channel Assignment
- Advanced tab.

This shows the panel displayed when editing the L5512RVF. Group Addresses are allocated for each channel on the relay. An existing Group is selected from the drop-down menu.

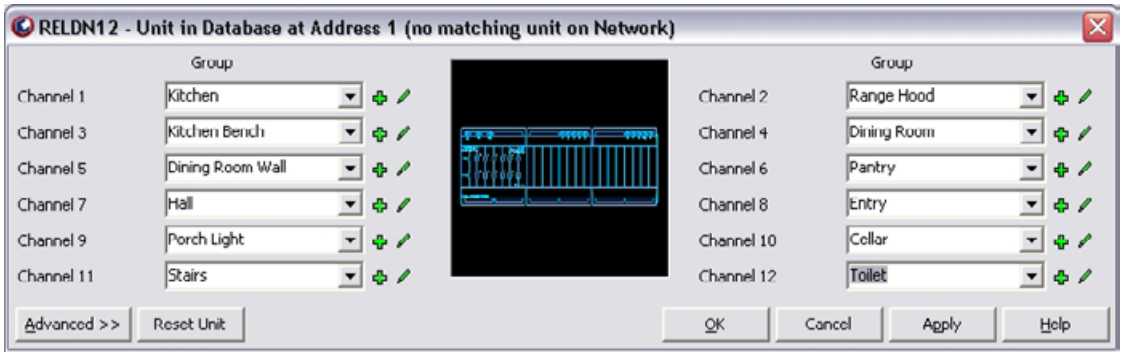


Figure 1 – Editing a Twelve Channel Voltage Free Relay unit

Click 'Add Group' the right of the drop-down menu to bring up the 'Group Add' panel displayed in (Figure 2). This allows a new Group Address to be added.

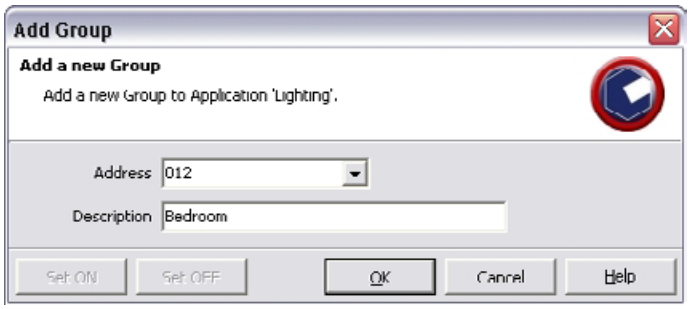


Figure 2 – Group Add

Click 'Symbol' to bring up the Group Edit panel displayed in (Figure 3). This allows the Tag of the currently selected Group Address to be changed.

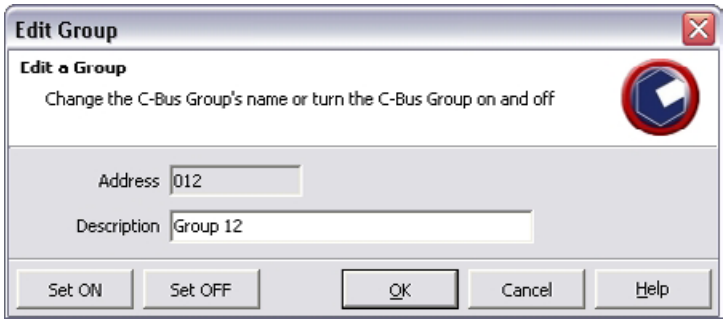


Figure 3 – Group Edit

3.0 C-Bus® Wall Switch

This section explains the basic programming of a 2000 Series Standard C-Bus® Wall Switch. C-Bus input units contain many common elements. These include:

- Key Assignment
- Functions
- Advanced tab.

(Figure 4) shows the panel displayed when editing a C-Bus wall switch. Group Addresses are allocated for each input (where there are multiple inputs). An existing Group is selected from the drop-down menu.

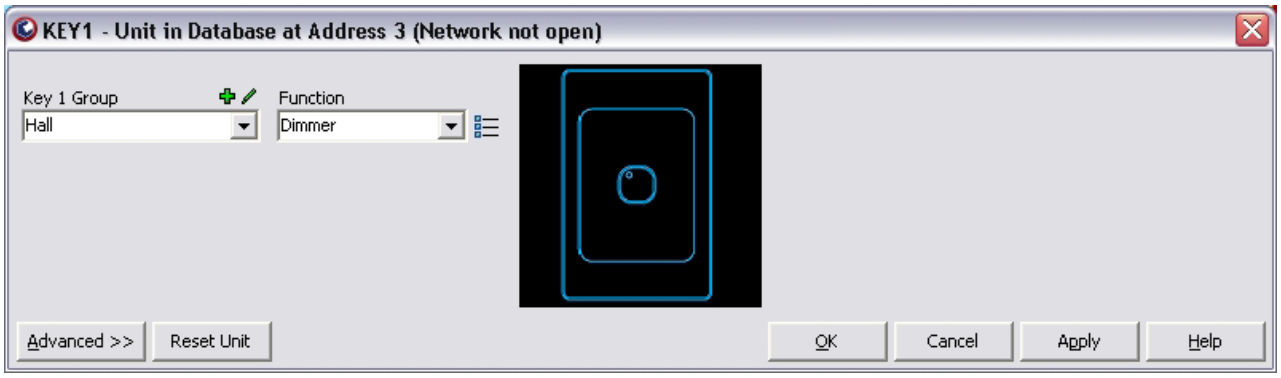


Figure 4 – Editing a 2000 Series Standard C-Bus® Wall Switch

As when programming an output unit, click the 'Add Group' icon to the right of the drop-down menu, which brings up the Group Add panel displayed in (Figure 2). This allows a new Group Address to be added.

3.1 Functions

Each input has a Function drop-down menu, through which a key function is assigned. Available functions vary depending on the type of input unit and Application Address. Table 1 provides a list of these functions together with their action. An assigned function is triggered when an input is activated. Most inputs are activated by pressing a button, but certain input units are triggered by other events, such as a change in lighting level or infrared radiation.

Function	Action
On	Set on
Off	Set off
On/Off	Alternate between set on and off
Dimmer	Dim up or down, according to the dimmer function mode, which is set by clicking the properties button. There are two dimmer modes, Toggle and Memory.Toggle:A quick button press alternates between set on and off. The dimmer switch does not remember a specific brightness level. A long button press alternately dims up and down.Memory:A quick button press alternates between a set to the previous dim level, and set off. A long button press alternately dims up and down.
On Up	A quick button press alternates between set to the previous dim level and set off. A long button press dims up.
Off Down	A quick button press alternates between set to the previous dim level and set off. A long button press dims down.
Timer	Initiate a count down timer, according to the timer function mode, which is set by clicking the see properties button. A set off command is issued when the timer expires. There are two timer modes, Toggle and Retrigger.Toggle:A button press alternates between set on and set off. A button release starts the timer.Retrigger:A quick button press issues a set on command and starts (or restarts) the timer. A long button press issues a set off command.
Bell Press	Set on until a button is released, then set off.
Dimmer Up	Dim up.
Dimmer Down	Dim down.
Soft Up	A quick button press issues a ramp to preset level command (Recall 1). A long button press dims up.
Soft Down	A quick button press issues a ramp off command. A long button press dims down.
Preset 1	A quick button press issues a set to preset level command (Recall 1). A long button press ramps off.
Preset 2	A quick button press issues a set to preset level command (Recall 2). A long button press ramps off.
Trigger 1	A quick (short) release triggers a Control Group Action Selector (stored in Recall 1), which is set by clicking the see properties button. This can be used to remotely trigger a scene in another C-Bus® unit. The Trigger 1 and Trigger 2 functions are only selectable when the Application Address type is set to Trigger Control.
Trigger 2	As per Trigger 1, but uses Recall 2 to store the Control Group Action Selector.
Unused	No action.
<Scene>	Execute a Scene (this is covered in the Advanced Programming module). A Scene is selectable on particular input unit types only, such as the Neo.
<Custom>	Execute a customised function, using the parameters defined in the Button (Key) Functions and Blocks tabs (covered in the Advanced Programming module).

Table 1 – Functions which can be assigned to an input

4.0 C-Bus® Light Level Sensor

The C-Bus® Light Level Sensor is a device used to measure ambient light, and transmit messages over the C-Bus Network in response to changing levels. It is designed to operate within the range of 40 to 1600 lux.

The sensor is capable of controlling the level of a group from 0 to 100%, or switching it on or off when a light level threshold is crossed. The sensor can be enabled or disabled from a Group Address.

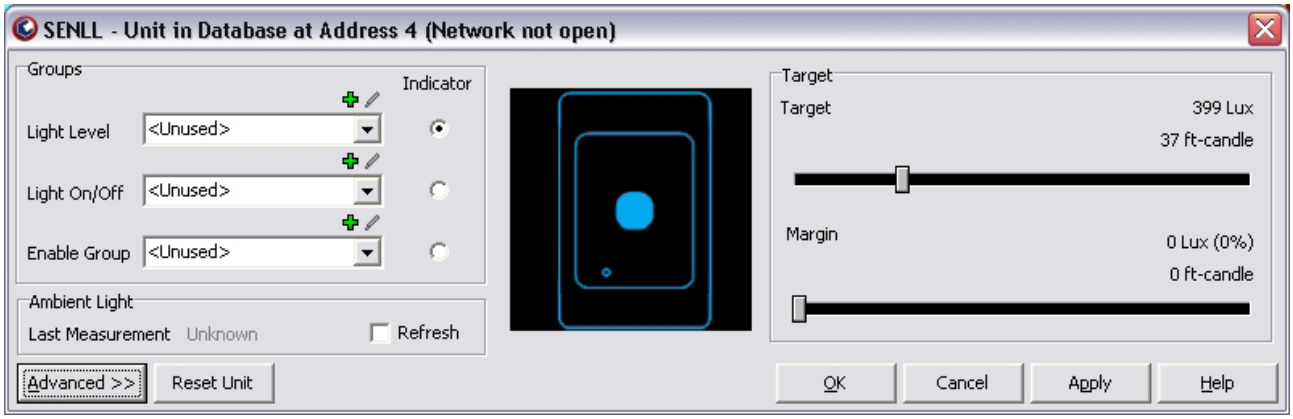


Figure 5 – Editing a PE Light Level Sensor unit

4.1 Groups

Three group control options are available for the C-Bus Light Level Sensor. (Figure 5) shows these options which appear in the Groups section when editing the unit with the C-Bus Toolkit software. The Indicator radio button lets you select which action controls the LED indicator on the sensor.

Available options are:

- Light Level — a group typically associated with a dimmer or analogue output module. The level is ramped up when the ambient lighting level falls below the defined Target Lux threshold.
- Light On/Off — a group typically associated with a relay output module. The group is switched on when the ambient lighting level falls below the defined Target Lux threshold.
- Enable Group — a group typically associated with an input unit. When this option is used, the PE Light Level Sensor will only issue C-Bus commands when the group is switched on.

4.2 Ambient light

This is used when connected to a live Network. When the Refresh option is checked, the approximate lighting level as read by the sensor is displayed.

4.3 Target

There are two values which determine the level at which the sensor responds to a change in ambient lighting levels:

- Target Lux — the threshold lux level below which any “Light Level” or “Light On/Off” group is activated. When used with dimmers you can think of this as the level of lighting that you would like to maintain.
- Margin — the level of variation from the Target Lux level at which the threshold operates. This can be used to prevent constant switching of relay levels when the ambient light level varies regularly (perhaps due to passing clouds). It means that a “Light On/Off” group can be set to turn on at a level below the Target Lux, and turn off at a level above the Target Lux.

5.0 C-Bus® PIR Occupancy Sensor

Currently there are three types of C-Bus® PIR Occupancy Sensor; two indoor models and an outdoor model. Each has the following features:

- Passive infrared movement detection
- Threshold adjustment on the physical unit
- Timer expiry actions, software adjustable from 0 to over 18 hours
- Separate day-time and night-time movement facilities
- A sunset switch facility
- A security pulse facility.

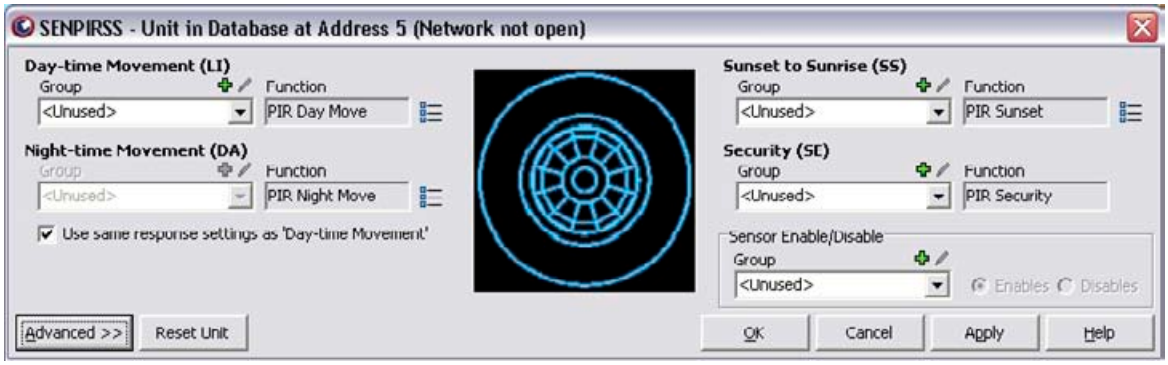


Figure 6 – Editing a PIR Occupancy Sensor

5.1 Adjusting the Light Level Sensor

The light level sensor must be adjusted to ensure it triggers the programmed load at the correct light level, as described in Table 2.

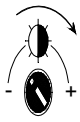
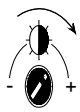
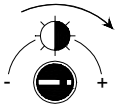
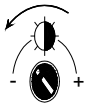
1.	Rotate clockwise to avoid activation of load when natural light is adequate.	
2.	To activate the load at dusk, set adjustment to this area.	
3.	To activate the load at night, set adjustment to this area.	
4.	To have the load activated day and night, set in this position.	

Table 2 – Adjusting a light level sensor

5.2 Day Time Movement Detection

This activates a group whenever the ambient lighting level is above the threshold set on the light level sensor, and movement is detected. The selectable group is located next to the PIR Day Move function. A timer can be used to perform an action (such as switch a group off) a definable period of time after movement is detected. Timer options can be seen in (Figure 7). They are accessed via the properties button.

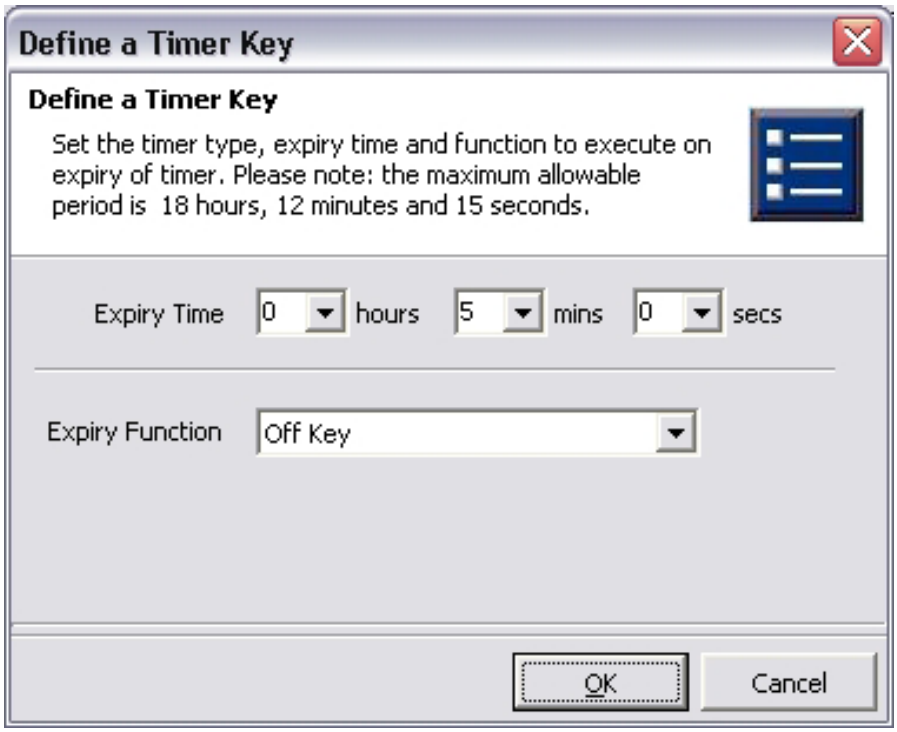


Figure 7 – Timer options

5.3 Night Time Movement Detection

This activates a group whenever the ambient lighting level is below the threshold set on the light level sensor, and movement is detected. The selectable group is located next to the PIR Night Move function. A timer can be used to perform an action (such as switch a group off) a definable period of time after movement is detected. Timer options are accessed via the properties button.

5.4 Sunset to Sunrise

The PIR sensors have a PIR Sunset function, which can switch lights on at sunset. The selected group is switched off after a timer expires or sunrise, whichever occurs first. Timer options are accessed via the properties button.

5.5 Security Features

PIR Sensors also have a security feature which sends a short pulse intended to drive a buzzer or light to indicate movement at any time, irrespective of the light threshold.

5.6 Functions Tab

The Functions tab (Figure 8) is accessible when the 'Advanced >>' button is used to display the advanced options. It allows the user to configure the C-Bus® PIR Occupancy Sensor in the same way as a Standard C-Bus Wall Switch.

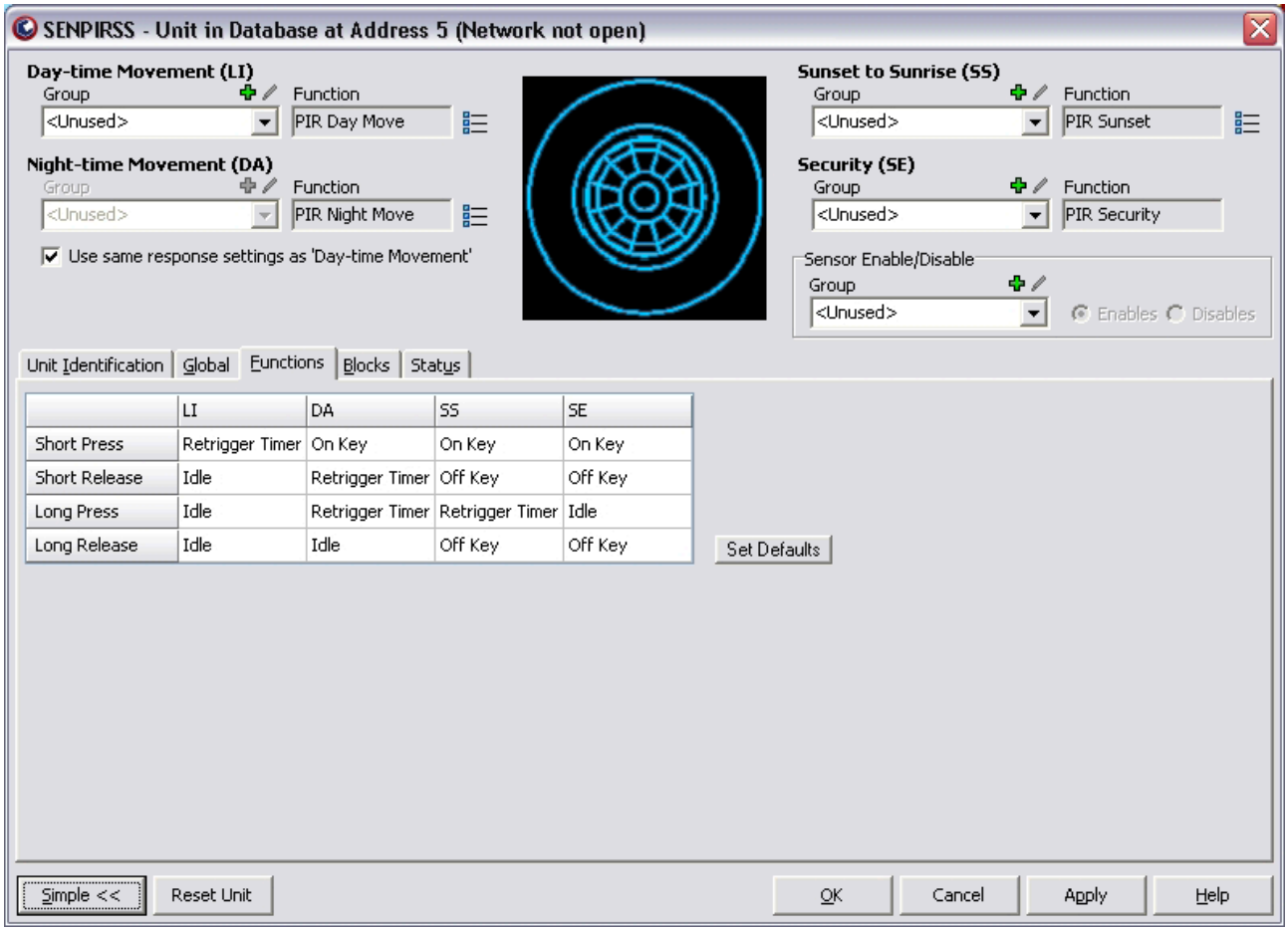
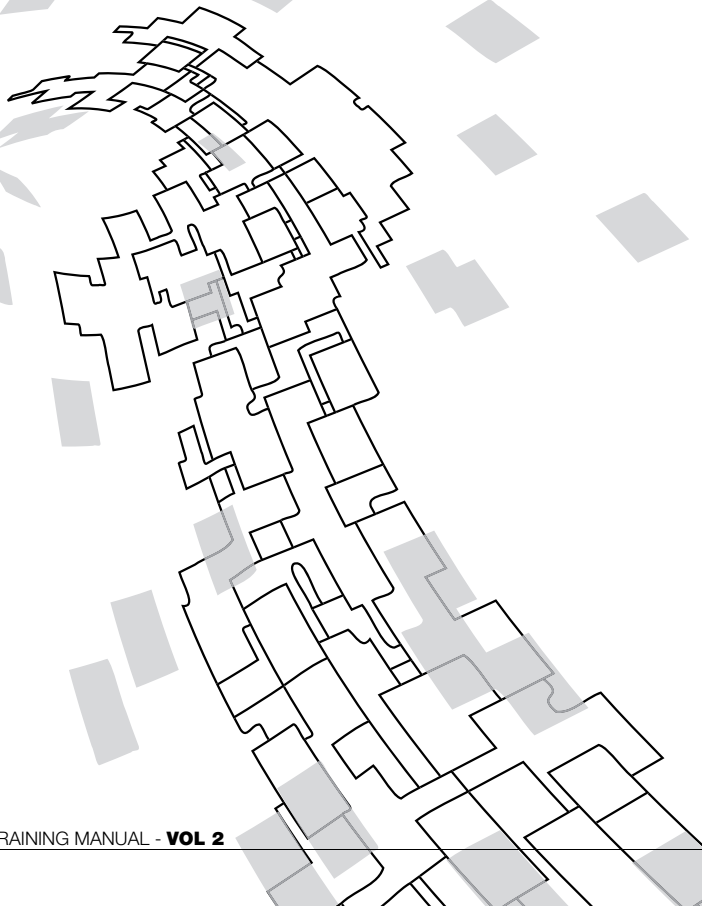


Figure 8 - Functions Tab

Volume 2C
Advanced Programming



Scope

This manual aims to provide an installer with the basic skills needed to program and use C-Bus®. A fundamental technical background is required.

The manual includes advanced programming information for:

- A voltage free relay (output unit)
- The Neo® (input unit)
- Scene control.

It is an ideal preparation before attending the C-Bus Basic Training Course.

Learning Outcomes

By the end of this module, you should have an understanding of:

- The C-Bus L5512RVF 12 Channel Voltage Free Relay
- The C-Bus Neo Wall Switch
- Scene control.

1.0 Voltage Free Relay

When editing a unit, the Edit panel displays options in either a Simple or Advanced format. The format is changed by clicking the Advanced or Simple button on the Edit panel. This section explains the advanced programming options available for the C-Bus® L5512RVF 12 Channel Voltage Free Relay.

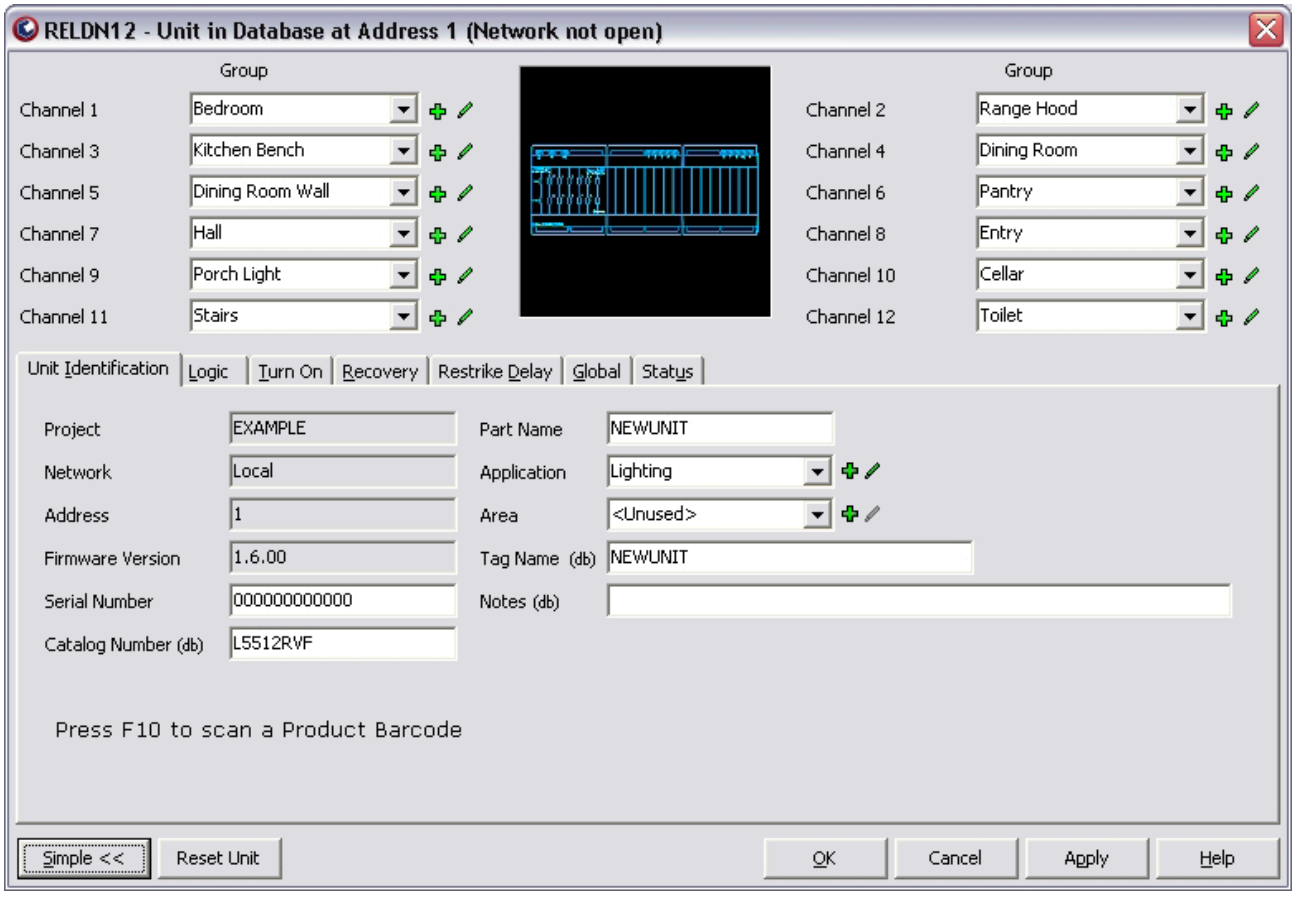


Figure 1 – Editing the C-Bus L5512RVF 12 Channel Voltage Free Relay, with the Unit Identification Tab selected

1.1 Unit Identification

Options are organised in different categories, and placed on different tabs. The Edit Unit panel in (Figure 1) has the Unit Identification tab selected. Table 1 lists the options on the Unit Identification tab, together with their description.

Option Name	Description
Project	The Project name
Network	The Network that the unit is physically connected to
Address	The Unit Address
Firmware Version	The internal microcode version
Serial Number	The embedded serial number
Catalogue Number	The CIS product catalogue number
Part Name	A name stored in the unit's hardware, limited to a mixture of eight upper case letters, numbers and the underscore character
Application	Allows the Application Address to be selected
Area	Allows the Area Address to be selected
Tag Name	The Unit Tag, up to 255 characters stored in the database only
Notes	Up to 255 characters of notes stored in the database only

Table 1 – Unit Identification tab field descriptions

1.2 Logic

The Logic tab provides more complex functionality. Up to four groups can be logically compared with the channel group assignments to determine what the channel output states will be. In the example in (Figure 2), the Outside Light group is assigned to Channel 11, and the Light Sensor group is a Logic Group used in conjunction with Channel 11. Since the And logic function is selected, Channel 11 will switch on only when both the Outside Light and Light Sensor Groups are enabled. If the 'Or logical' function was selected instead of the 'And', Channel 11 would switch on when either the Outside Light or the Light Sensor group is enabled (or both).

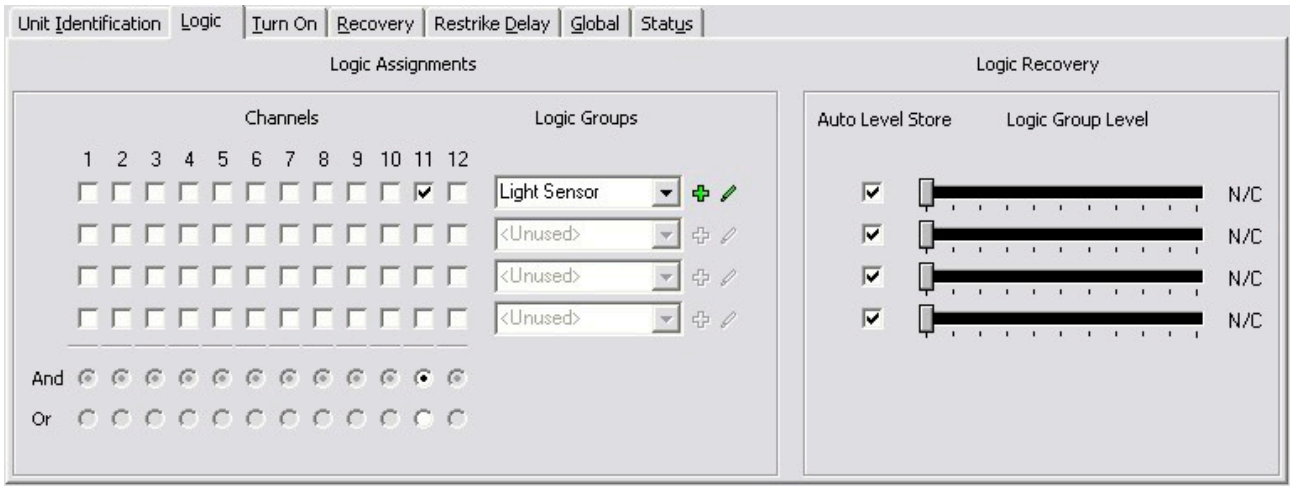


Figure 2 – Editing the C-Bus® L5512RVF 12 Channel Voltage Free Relay, with the Logic tab selected

For a relay unit, logic relationships can be created to simulate switches in series (And logic), or switches in parallel (Or logic).

For dimmer and analogue output units, logic relationships can be created to ensure the state of the load will be equal to the maximum level of the associated groups (Max logic). Alternatively, the state of the load may assume the minimum level of the associated groups (Min logic).

1.3 Turn On

In relay units, the Turn On Threshold levels (Figure 3) determine the level at which output units switch on in response to their controlling group levels.

In dimmer units, the Turn On Threshold levels determine the minimum and maximum output levels which are used in response to controlling group levels. If channel 1 is set to minimum and maximum levels of 40% and 80% respectively, the output will be set to 40% in response to a controlling group level of 1%, and to 80% in response to a controlling group level of 100%.

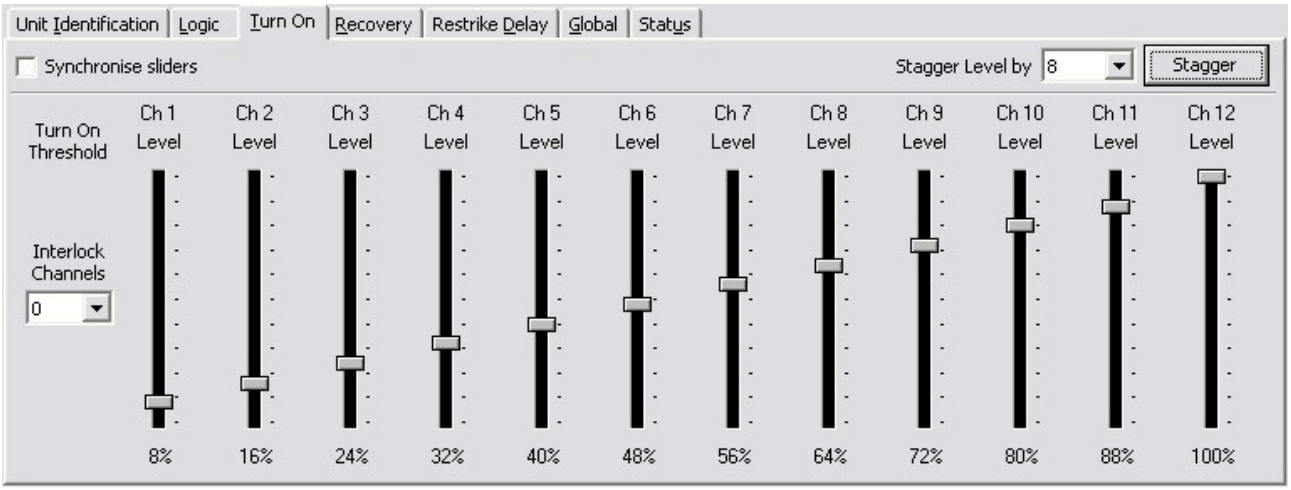


Figure 3 – Editing the C-Bus® L5512RVF 12 Channel Voltage Free Relay, with the Turn On tab selected

Turn On Threshold is commonly used:

- To set a minimum brightness level on one or more channels
- For Light Level Sensor relay switching (sunset and switched bank dimming)
- For manual switched bank dimming
- To stagger relay switching in order to manage inrush currents across multiple circuits.

Staggered levels are set by selecting a Stagger Level percentage and pressing the Stagger button. The channel threshold level of each output is then sequentially incremented by the approximate percentage value.

1.3.1 Interlock Channels

This option sets the number of sequential output channels to be 'interlocked' together. When channels are interlocked, only the highest numbered interlocked channel will respond to an enabled group. For example is the Interlock value is set to 4, channels 1 to 4 will be interlocked. If the groups on channels 1 and 3 were enabled, only channel 3 would switch on. This feature could be used in motor speed control switching.

1.3.2 Synchronise Sliders

When this option is checked, adjusting the level of any slider sets all to the same level.

1.4 Recovery

The Recovery tab shown in (Figure 4), allows you to set the state that each channel defaults to when recovering from a power failure. When a channel's Auto Level Store option is checked, each channel will be restored to the level it was at when the power failure occurred. Alternatively, the values selected on the sliders will be used as the restore levels.

As with the Turn On tab, a Synchronise Sliders option allows all sliders to be adjusted to the same level using one slider. Staggered levels can be set by selecting a Stagger Level percentage and pressing the Stagger button.

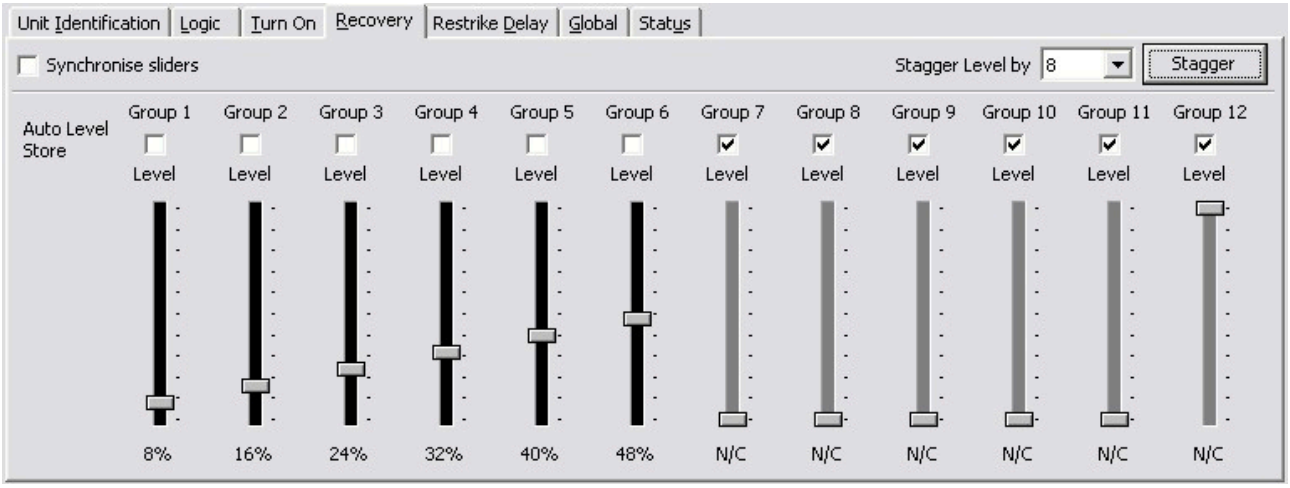


Figure 4 – Editing the C-Bus® L5512RVF 12 Channel Voltage Free Relay, with the Recovery tab selected

1.5 Restrike Delay

The Restrike Delay is primarily intended for use with lamps that must be allowed to cool down before they are restarted. Such lamps are typically metal halide or sodium vapour. The delay is set via a slider (Figure 5), to a value of up to 42 minutes and 30 seconds (in 10 second increments).

The Restrike Delay applies to channels which have the option checked. Once a channel is turned off, it cannot be turned on until the set delay time has expired. If a channel with restrike delay is switched on immediately after being switched off, the on command is ignored until the delay time expires.

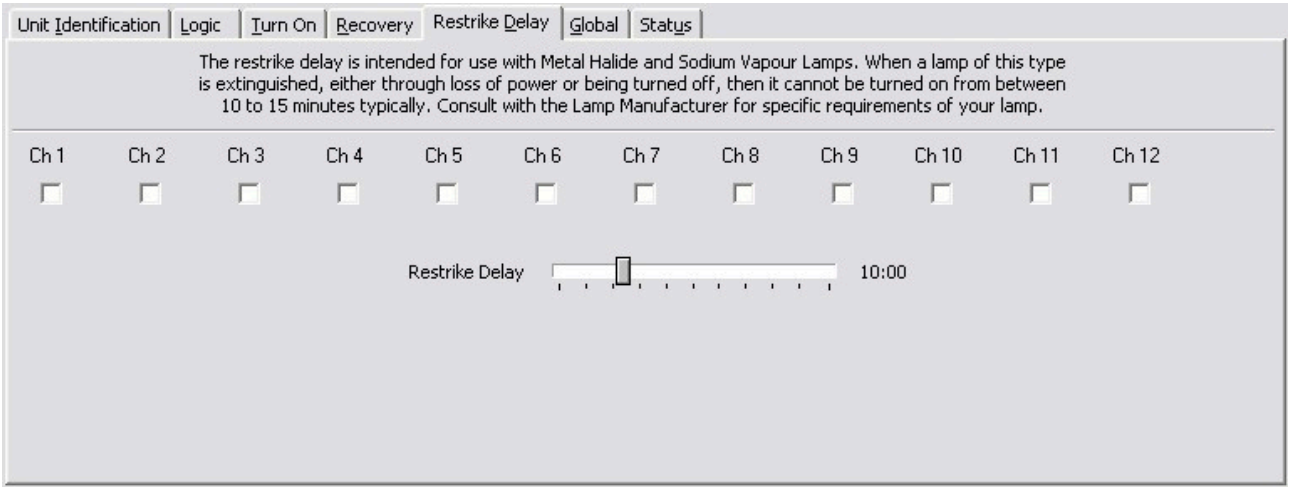

Unit Identification
Logic
Turn On
Recovery
Restrike Delay
Global
Status
The restrike delay is intended for use with Metal Halide and Sodium Vapour Lamps. When a lamp of this type is extinguished, either through loss of power or being turned off, then it cannot be turned on from between 10 to 15 minutes typically. Consult with the Lamp Manufacturer for specific requirements of your lamp.
Ch 1
Ch 2
Ch 3
Ch 4
Ch 5
Ch 6
Ch 7
Ch 8
Ch 9
Ch 10
Ch 11
Ch 12
Restrike Delay
10:00

Figure 5 – Editing the C-Bus® L5512RVF 12 Channel Voltage Free Relay, with the Restrike Delay tab selected

1.6 Global

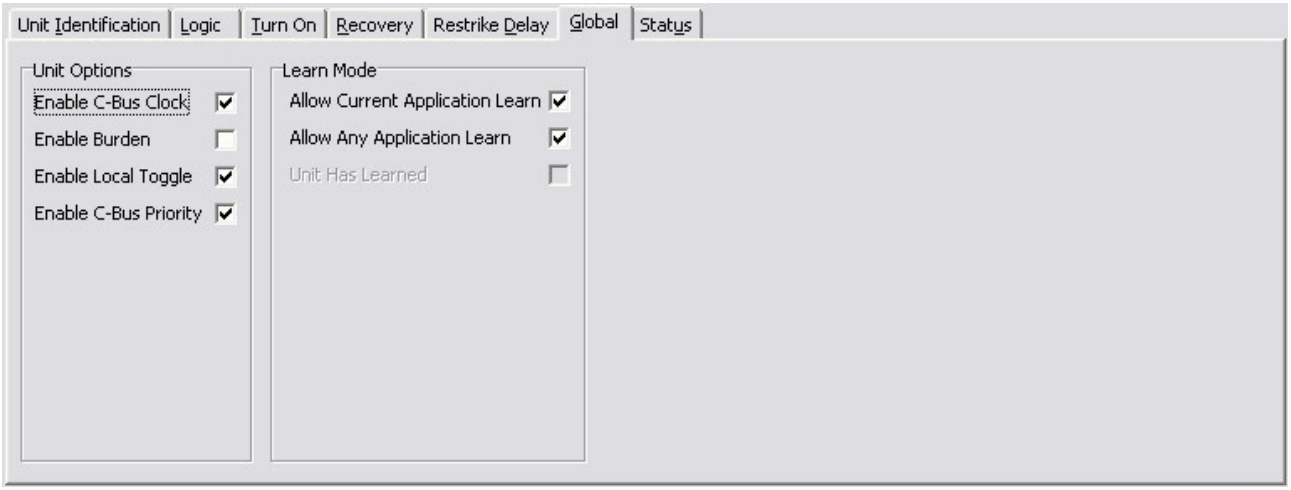


Figure 6 – Editing the C-Bus® L5512RVF 12 Channel Voltage Free Relay, with the Global tab selected

The Global tab provides several options, which apply to the unit as a whole. Unit options are described in Table 2. Learn mode options are described in Table 3.

Option	Description
Enable C-Bus Clock	Sets the status of the inbuilt C-Bus clock (enabled as default).
Enable Burden	Sets the status of the inbuilt Network burden (enabled as default, but only available if the Unit Address is 001).
Enable Local Toggle	Determines whether the local toggle buttons can be used to control the channel outputs, overriding the group levels (enabled as default).
Enable C-Bus Priority	Determines whether new C-Bus commands will override states set via the local toggle buttons (enabled as default).

Table 2 – Unit options

Option	Description
Allow Current Application Learn	Determines whether learn mode can be used to group channels with other units of the same Application Address.
Allow Any Application Learn	Determines whether learn mode can be used to group channels with other units of any Application Address. When grouping channels of units with different Application Addresses using learn mode, the Application Addresses of all units being included in the group will be changed to that of the unit from which learn mode is exited.
Unit Has Learned	This indicates that the unit has been involved in a learn mode operation.

Table 3 – Learn mode options

1.7 Status

The Status tab (Figure 7) displays the status of various device properties. These can be refreshed by clicking the Update Status button.

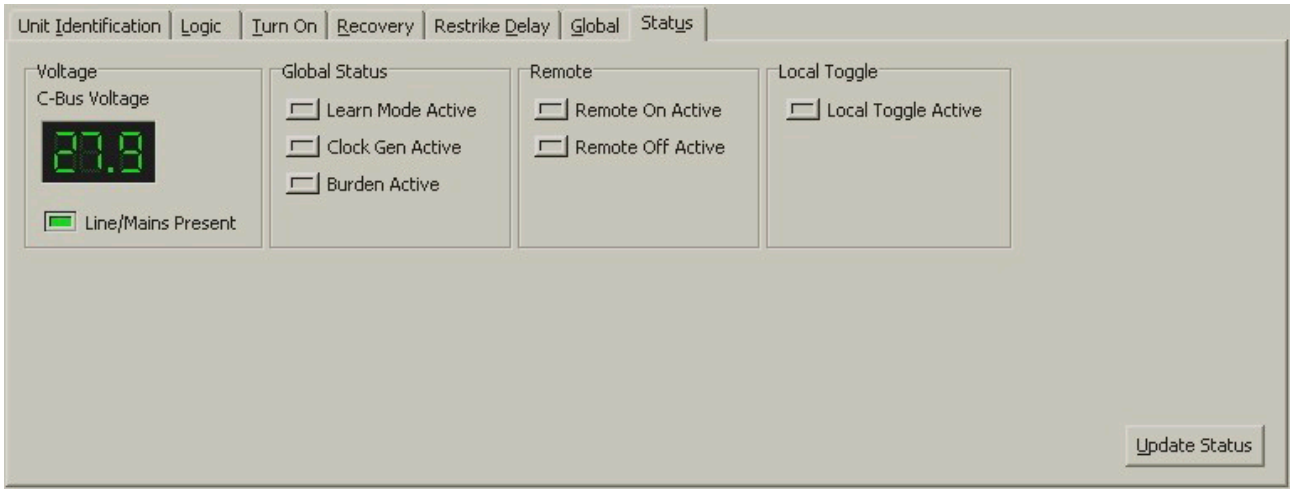


Figure 7 – Editing the C-Bus® L5512RVF 12 Channel Voltage Free Relay, with the Status tab selected

2.0 Neo®

This section explains the advanced programming options available for the C-Bus® Neo® Wall Switch.

2.1 The Unit Identification Tab

The Unit Identification tab (Figure 8) contains the same options as the C-Bus L5512RVF 12 Channel Voltage Free Relay with the addition of a Secondary Application.

This allows the use of two different applications on the one unit.

When a Secondary Application is specified, the 'P' to the left of the Key group can be clicked on to select the Secondary Application (it will now change to 'S'. This will make a list of Group Addresses in the Secondary Application available, or allow creation of new Groups Address within this Secondary Application.

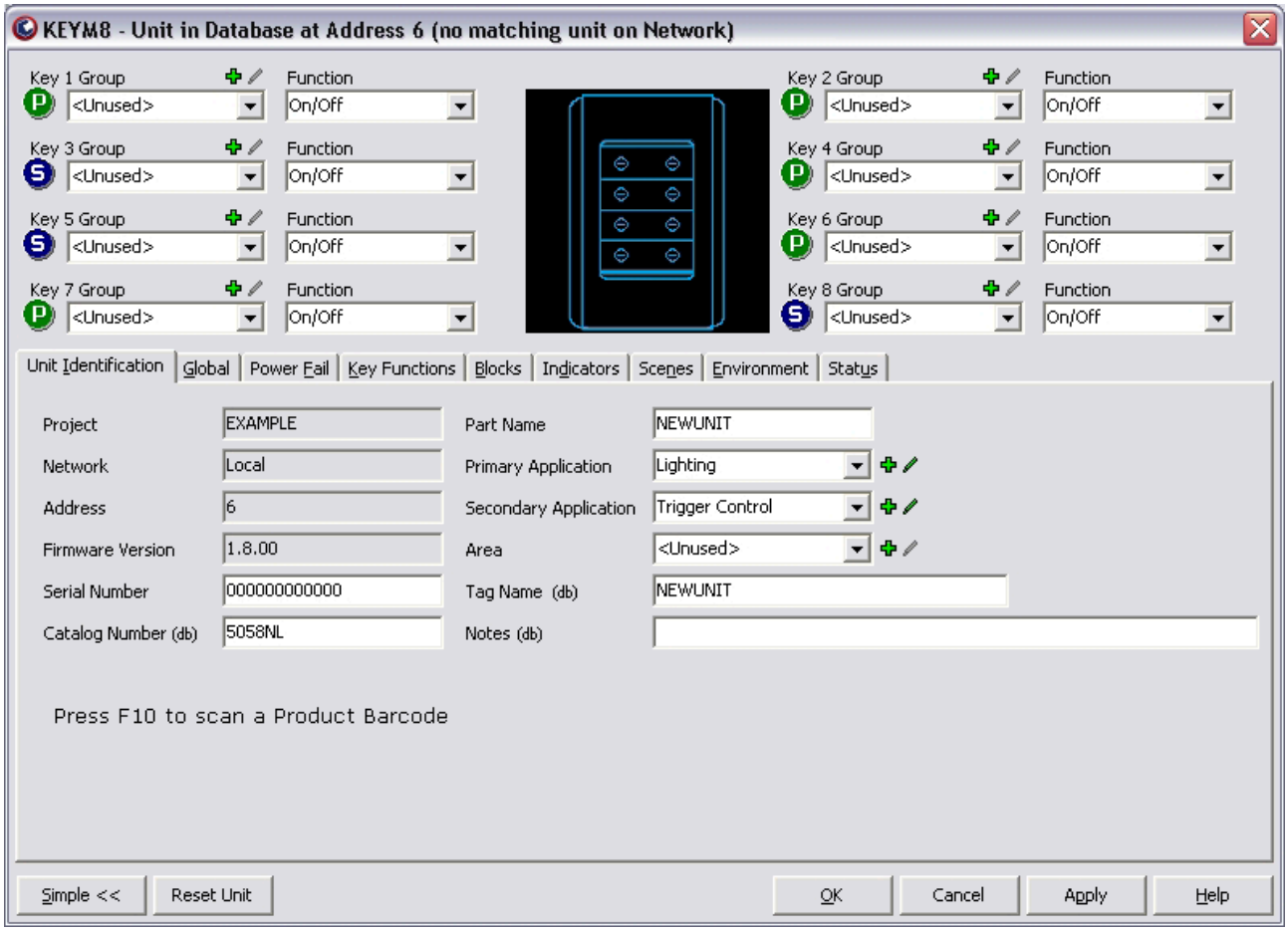


Figure 8 – Editing a C-Bus Neo Wall Switch, with the Unit Identification tab selected

2.2 Global Tab

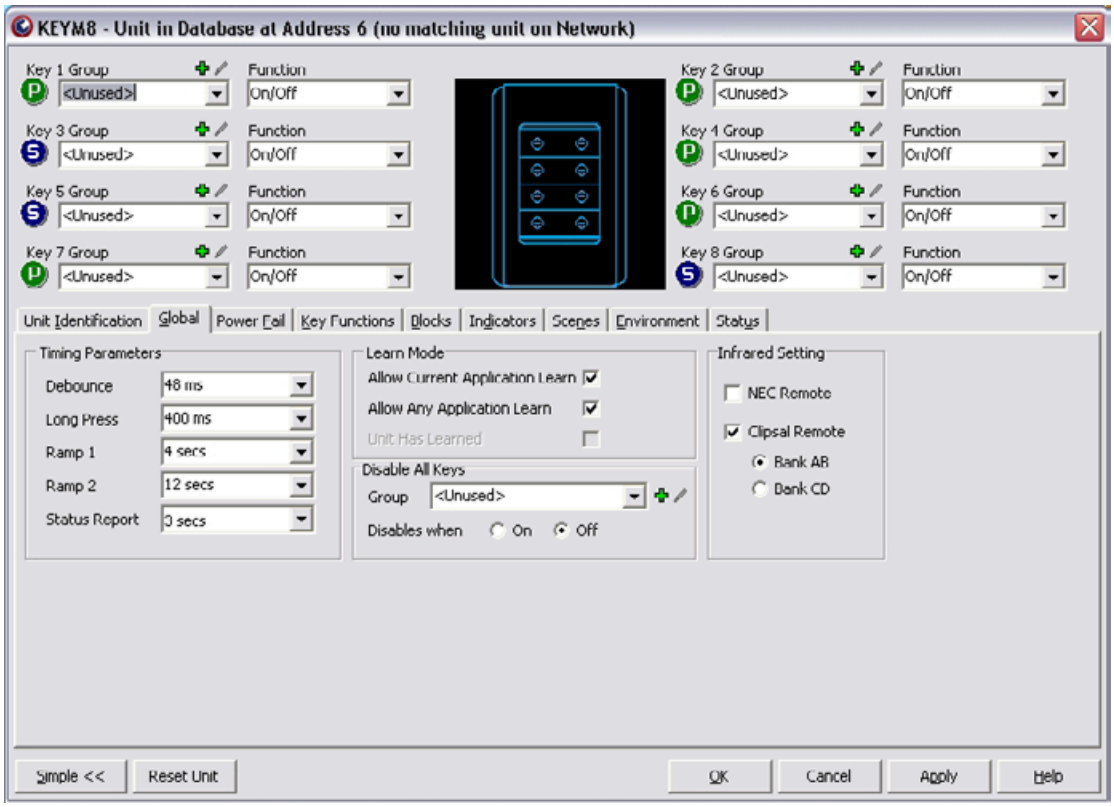


Figure 9 – Editing a C-Bus® Neo® Wall Switch, with the Global tab selected

2.2.1 Debounce

The buttons used in wall switches are mechanical and may exhibit contact bounce during switching. To achieve reliable switching operation, a preset time period must occur before the unit responds to a button being pressed. This is the debounce time.

PIR sensors also have an adjustable debounce time, which can be used to reduce their sensitivity by increasing the debounce time.

The default value is 48 milliseconds for wall switches and 96 milliseconds for PIR sensors.

2.2.2 Long Press Time

A wall switch senses whether a button is pressed quickly or for a long period of time. The Long Press setting determines what length of button press is interpreted as a long press. The default value is 400 milliseconds.

2.2.3 Ramp 1

This parameter gives the time taken to ramp a light from minimum to maximum brightness (or vice versa), using the Up Key, Down Key or Down Cycle Key Commands. The default value is 4 seconds.

2.2.4 Ramp 2

This parameter gives the time taken to ramp a light from minimum to maximum brightness (or vice versa), using the Ramp Off or Ramp Recall Key Commands.

The default value is 12 seconds.

2.2.5 Status Report

Wired C-Bus® uses a status reporting system (known as an MMI), which provides automatic detection and correction of discrepancies between the states of grouped inputs and outputs. This status reporting occurs at periodic intervals. Increasing the frequency of status reporting decreases the response time in which errors are corrected. However, it increases the amount of Network communication traffic. If different status report values exist in the same Network, the smallest value is used.

The default value is 3 seconds.

2.2.6 Learn Mode

Option	Description
Allow Current Application Learn	Determines whether learn mode can be used to group channels with other units of the same Application Address.
Allow Any Application Learn	Determines whether learn mode can be used to group channels with other units of any Application Address. When grouping channels of units with different Application Addresses using learn mode, the Application Addresses of all units being included in the group will be changed to that of the unit from which learn mode is exited.
Unit Has Learned	This indicates that the unit has been involved in a learn mode operation.

Table 4 – Learn mode options

2.2.7 Disable All Keys

Allows the specification of a Group Address in the Enable Control application, which can be used to disable all keys on this Key Unit.

2.2.8 Infra-red Setting

Allows the selection of Infra-red remote controls to use with this unit.

2.3 Power Fail Tab

The Power Fail tab shown in (Figure 10), allows you to set the level that each channel defaults to when recovering from a power failure. Note that Recovery tab settings in an output unit (such as a relay or dimmer) take precedence over Power Fail tab settings in an input unit. Generally, it is better to use the Recovery tab options in output units instead of the Power Fail tab options. If the 'Restore to previous levels' option is selected, each channel will be restored to the level it was at when the power failure occurred. If the 'Restore to preset levels' option is selected, the values selected on the sliders will be used as the restore level.

When the Synchronise slider option is checked, adjusting the level of any slider sets all to the same level.

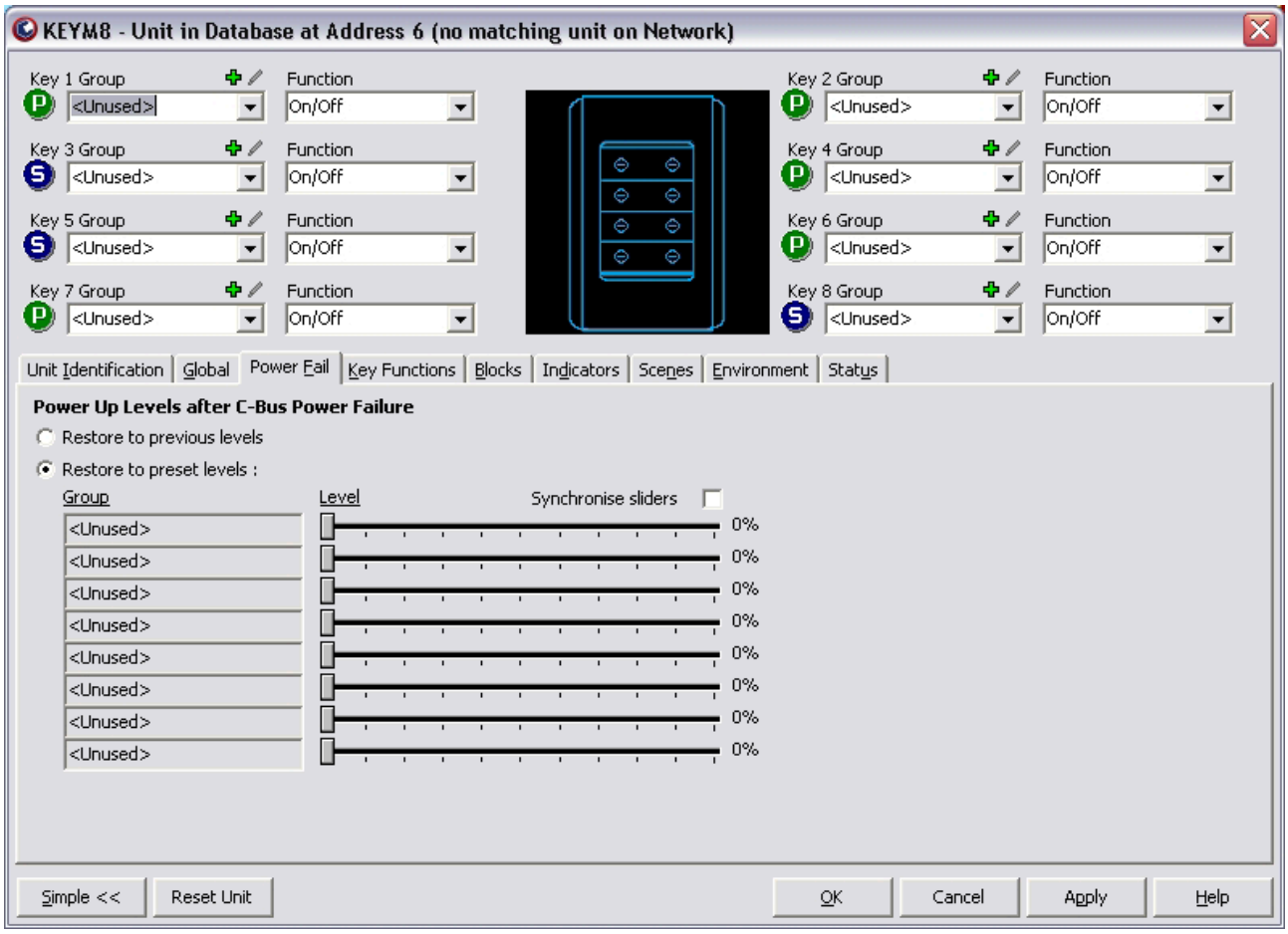
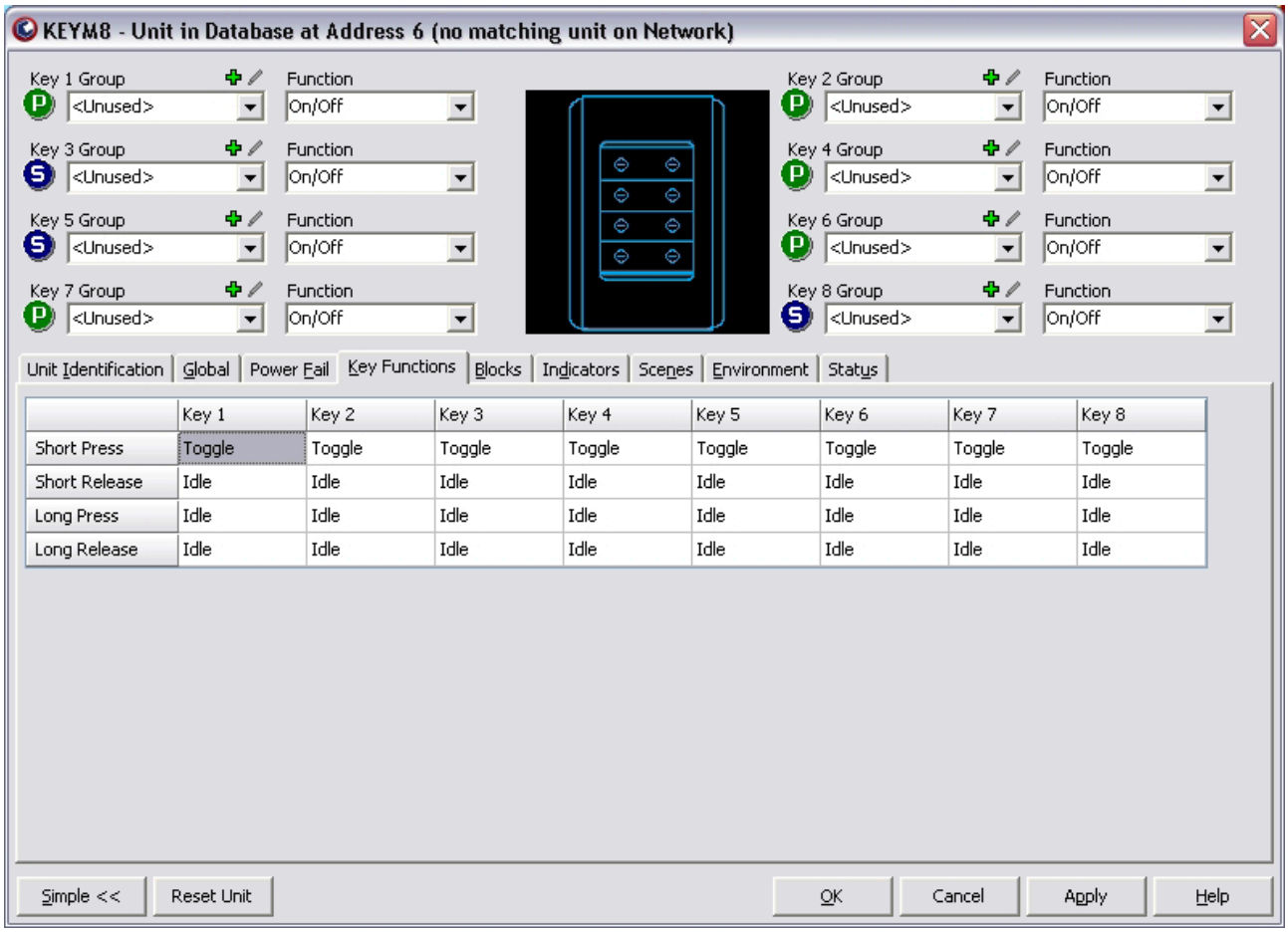


Figure 10 – Editing a C-Bus® Neo® Wall Switch, with the Power Fail tab selected

2.4 Key Functions Tab

The Key Functions tab (Figure 11) provides advanced setup for each wall switch button, allowing configurations that are not provided for in the simple set up screen.



Key functions can be assigned to the following types of button actions:

- Short Press (when the button is first pressed after the debounce time)
- Short Release (when the button is released before the long press time is reached)
- Long Press (when the button has been pressed and held for longer than the Long press time)
- Long Release (when the button is released after a long press has occurred).

The possible key functions are described in table 5.

Function	Action
Idle	No action
Store 1	This stores the current level in internal the Recall 1 memory location (Blocks tab). When the Recall 1 function is used, the group level reverts to this state. The level is stored in non-volatile memory. No transmission is made over the C-Bus® Network.
Downcycle	The output level is ramped down to minimum. If the output is already at minimum, it ramps up to maximum.The Downcycle function should be used in conjunction with the End Ramp function to ensure that ramping ends at the desired level. The direction of output ramping changes with each successive Downcycle / End Ramp operation. This allows a single button to act as an up/down light dimmer. The Off Key function can be used to terminate ramping if required. A RAMP TO LEVEL message is transmitted over the C-Bus Network.
Memory Toggle	If the output is on, the Memory Toggle function stores the current level in the Recall 2 memory location (Blocks tab) and switches the output off. If the output is off, the function sets the output to the last level stored in the Recall 2 memory location (the previous brightness level). An OFF or RAMP TO LEVEL message is transmitted over the C-Bus Network.
Down Key	This function is similar to Downcycle except that it can only ramp the output level downwards. The output will be ramped to the minimum level unless either the End Ramp or Off Key function terminates the process early. The ramp rate for the Down Key function is set by the 'Ramp 1' parameter (Global tab). The Down Key function has no effect if the current output is in the off state. A RAMP TO LEVEL message is transmitted over the C-Bus Network.
Up Key	The output level increases to the maximum level, unless either the End Ramp or Off Key function ends the process early. The ramp rate for the Up Key function is set by the 'Ramp 1' parameter (Global tab). If the current level is already at a maximum, no action will occur. A RAMP TO LEVEL message is transmitted over the C-Bus Network.
Recall 1	The output level is set to the level stored in the Recall 1 memory location (Blocks tab). A RAMP TO LEVEL message is transmitted over the C-Bus Network.
Recall 2	The output level is set to the level stored in the Recall 2 memory location (Blocks tab). A RAMP TO LEVEL message is transmitted over the C-Bus Network.
Retrigger Timer	The retrigger timer command starts the internal timer only if the output is currently on (at any level). If the output is already on, the timer is restarted. A RAMP TO LEVEL message is transmitted over the C-Bus Network.
Start	The internal timer is started without affecting the output level (if the timer value is greater than zero).An ON message may be transmitted over the C-Bus Network.

Function	Action
Ramp Off	The output level is ramped to the minimum level and then switched off. The ramp rate is set by the 'Ramp 2' parameter (Global tab). This function cannot be interrupted by the End Ramp function. A RAMP TO LEVEL message is transmitted over the C-Bus Network.
Ramp Recall 1	The output level is ramped up or down (depending on the current level), to the level stored in the Recall 1 memory location (Blocks tab). The ramp rate is set by the 'Ramp 2' parameter (Global tab). This function cannot be interrupted by the End Ramp function. A RAMP TO LEVEL message is transmitted over the C-Bus Network.
Toggle	If the output is currently off, it is set to the maximum level. Otherwise it is switched off. An ON or OFF message is transmitted over the C-Bus Network.
On Key	If the output is off, it is set to the maximum level. Otherwise no action is taken. An ON message may be transmitted over the C-Bus Network.
Off Key	If the output is not off, it is switched off. Otherwise no action is taken.An OFF message may be transmitted over the C-Bus Network.
End Ramp	The ramping action initiated by a Downcycle, Down Key or Up Key function is terminated. This allows an output to be set at an intermediate level. A RAMP TO LEVEL message is transmitted over the C-Bus Network.

Table 5 – Functions which can be assigned to a button

2.5 Blocks Tab

The Block table (Figure 12) displays the operating configureuration of the wall switch. Each row in the table allows a Group Address to be associated with one or more input buttons. It is here that the Recall levels, Timer value and Expiry key function are specified. LED indicator assignments are also specified in the Block table.

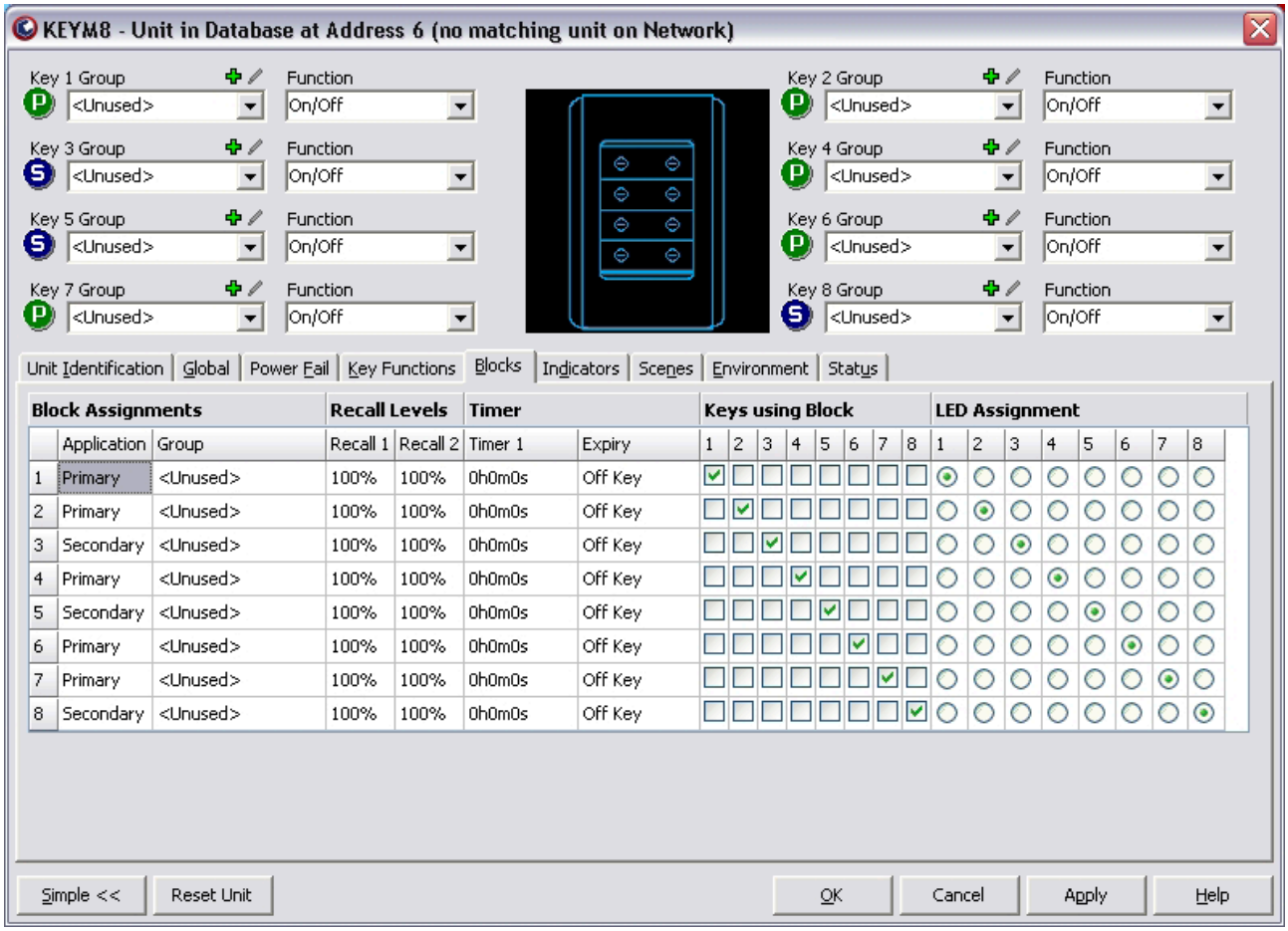


Figure 12 – Editing a C-Bus® Neo® Wall Switch, with the Block tab selected

2.5.1 Recall Levels

Recall 1 and Recall 2 contain levels which are stored in non-volatile memory. These are used by the Recall 1, Recall 2, Ramp Recall and Memory Toggle key functions. The levels stored in Recall 1 and Recall 2 may be overwritten by the Memory Toggle or Store 1 key functions.

2.5.2 Expiry

The Expiry is the key function to be called when the timer expires. For example, Off Key would switch the output off. This is not used when the Timer is set to a value of 0h0m0s.

2.5.3 LED Assignment

The indicator LEDs of the buttons are normally assigned to the same Groups as the buttons themselves (Buttons (Keys) using Block). However, it is possible to assign the indicator LEDs to another Group.

2.6 Indicators Tab

The Indicator tab (Figure 13) provides options which affect the LED indicators on the Neo® unit.

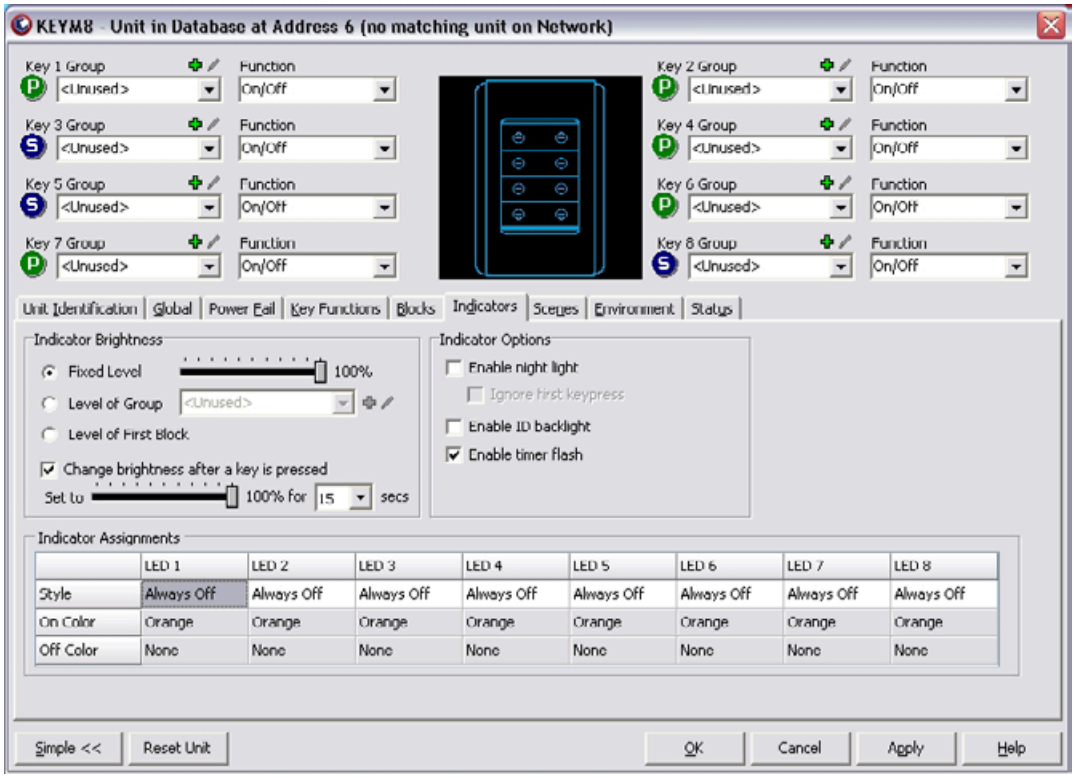


Figure 13 – Editing a C-Bus® Neo Wall Switch, with the Indicators tab selected

The Neo supports several types of LED states and modes. These are:

- Standard LED indicators which typically indicate the on/off status of a button
- Changed brightness LED indicators which are standard LED indicators with a temporarily modified brightness (after a button is pressed)
- Blue night light LEDs near the top and bottom of the unit
- Orange ID backlight LEDs between each left and right input button pair.

2.6.1 Fixed Level

This affects the standard LED indicators, blue night light LEDs and the orange ID backlight LEDs. The brightness is set to the specified value. The valid values of 0 to 100% are relative only (0% is the lowest visible level).

2.6.2 Level of Group

This affects the standard LED indicators, blue night light LEDs and the orange ID backlight LEDs. The brightness follows the level of the specified Group Address (on the same Application).

Change brightness after a button (key) is pressed

This option has several features. When enabled:

- The standard LED indicators do not function when the 'Enable night light' option is also enabled.
- Instead, the changed brightness LED indicators take effect whenever a button is pressed.
- The orange ID backlight LED levels temporarily change to the specified brightness whenever a button is pressed.
- The blue night light LEDs (if enabled) turn off temporarily whenever a button is pressed.
- If the 'Ignore first button press (keypress)' option is enabled, the button press which activates the changed brightness LED indicators will not change the state of the button pressed.

2.6.3 Enable Night Light

This activates the blue night light LEDs.

2.6.4 Ignore First Button Press (Keypress)

This option only applies when the 'Change brightness after a button (key) is pressed' option is also enabled. The first button pressed in the period of time specified under that option will not change the state of the button pressed.

2.6.5 Enable ID Backlight

This activates the orange ID backlight LEDs.

2.6.6 Enable Timer Flash

When enabled, a standard LED indicator will flash when a timer has been activated on its associated wall switch button.

2.7 Scenes Tab

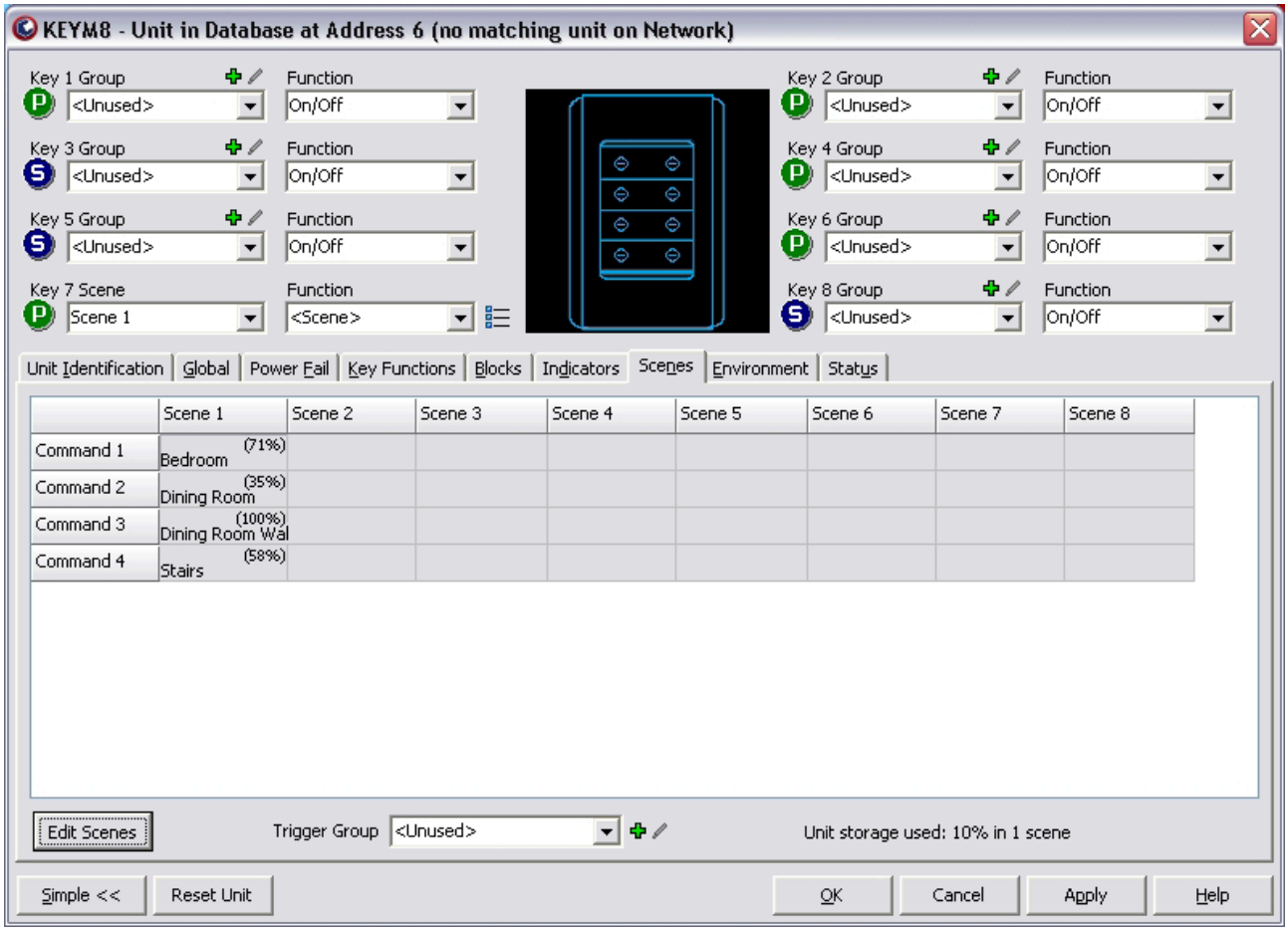


Figure 14 – Neo® Scenes Tab

The Scenes Tab displays all scenes and the Group Addresses used.

Unit storage used and number of screens is displayed.

The Trigger Group can be created or selected from the drop down box at the bottom of the GUI.

Scenes may be edited or created via the edit scenes button.

2.8 Environment Tab

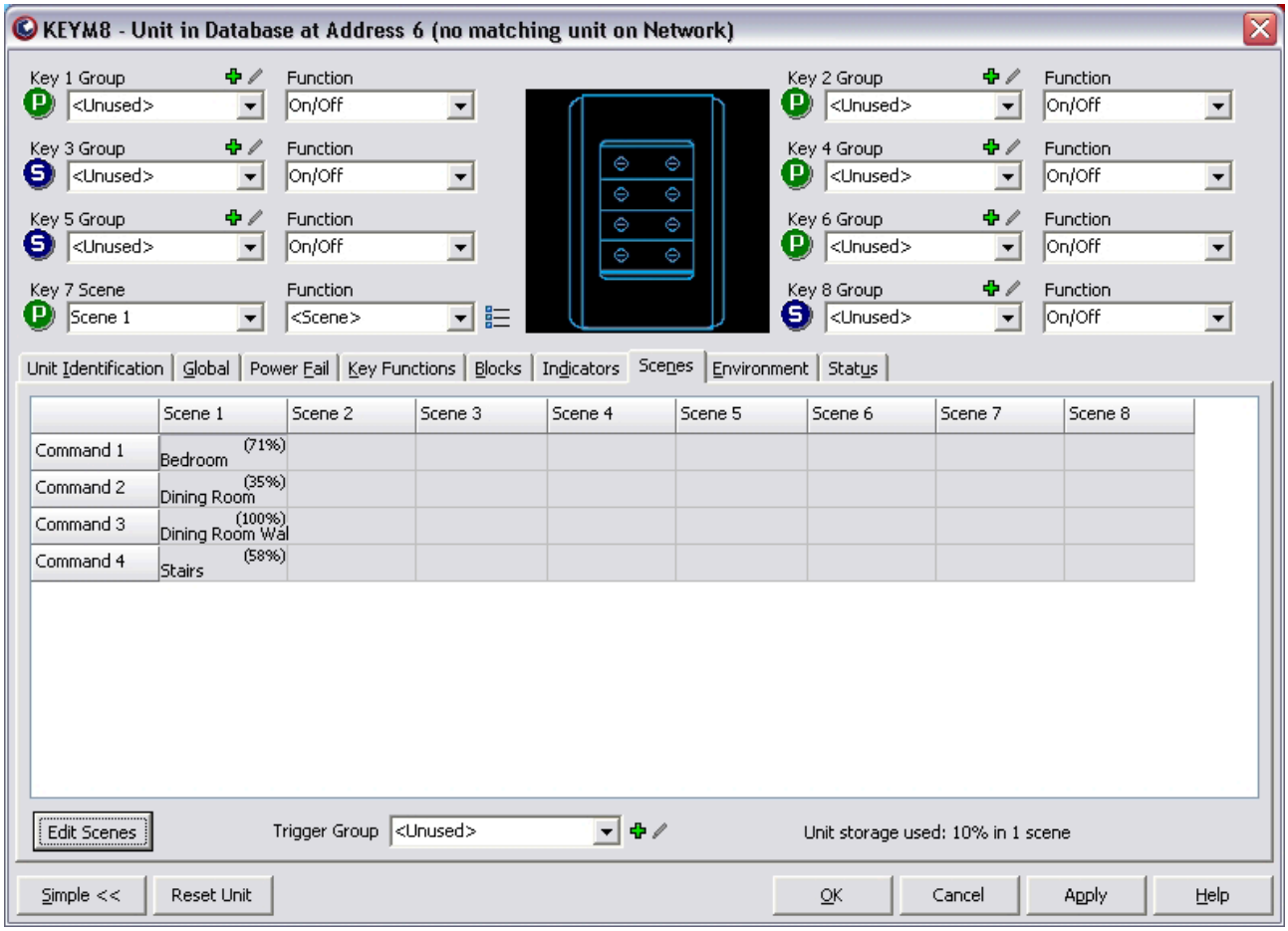


Figure 14 – Neo Scenes Tab

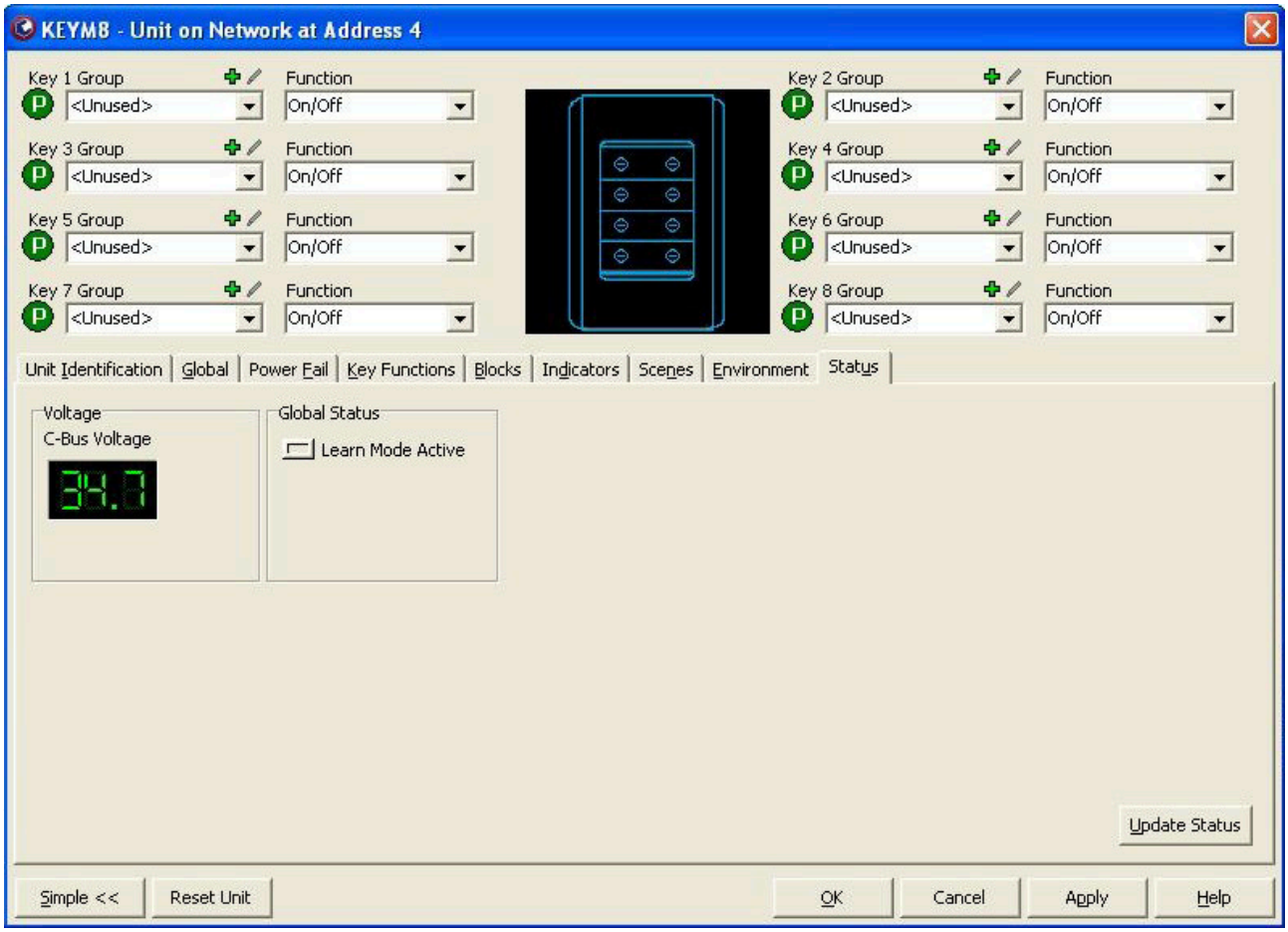
The Environment tab allows Corridor Linking to be enabled and the necessary parameters to be set up.

2.9 StatusTab

These features (Figure 14) are only available if the Network is open and connected to a PC.

The C-Bus® voltage of this unit is displayed, and refreshed whenever the Update Status button is clicked.

The Learn Mode Active feature indicates if the unit is currently in the learn mode state.



3.0 Scene Control

The implementation of scenes has many benefits. At the press of one button, a C-Bus® user has the control of many individual loads. These loads may be turned on, off or dimmed to a level.

There may be a requirement to have certain lights set to various levels for different functions. For example, say a dining room area has multiple low voltage lights. A scene could be used to set the light above the dining table to 100% and all others to 50%. This could be accomplished with a single button press. After dining, another scene could be used to configure the lounge room lighting in readiness for the guests.

3.1 Units with Scene Capability

Many C-Bus units have the ability to store and execute scenes. These include:

- C-Bus Neo Wall Switches with Dynamic Labelling Technology (DLT)
- Ulti Saturn Series Wall Switches
- Reflection Series Wall Switches
- The Scene Master Scene Controller
- The C-Touch Colour Touch Screen
- The C-Touch Black & White Touch Screen
- The Multi Sensor.

This section focuses on the Neo® unit. However, the principles are similar for all scene capable units. The aim is for an individual button to control multiple loads (lights etc) to suit a particular requirement. Most products have manuals which contain useful information relating to scene programming for a specific unit type.

The majority of C-Bus units which are capable of scene control are C-Bus input units. C-Bus output units must be used in conjunction with scene capable units for a scene to be useful. Loads (such as lights) are controlled by C-Bus devices such as dimmers and relays, which must provide sufficient current carrying capability for the load.

3.2 Programming the Neo®

Step 1: Open the Neo Unit's Edit Panel

Open the Edit Panel of the Neo unit to be programmed, by double-clicking on the unit in the Database view (Figure 15). A typical Neo Edit Panel is shown in (Figure 18).

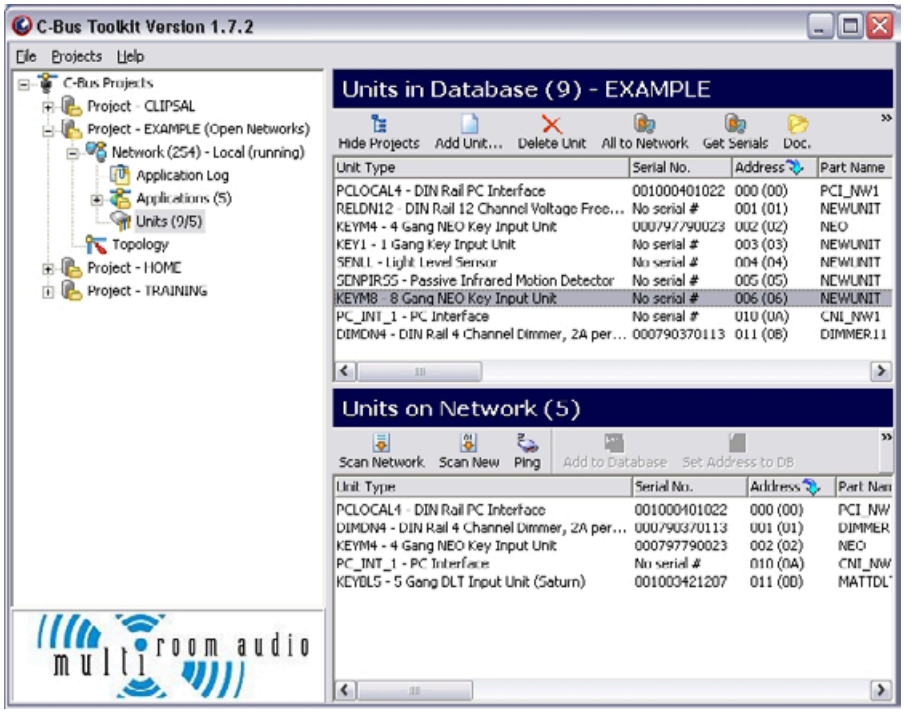


Figure 17 – To open the Neo's® Edit Panel, double-click on the unit in the Database view

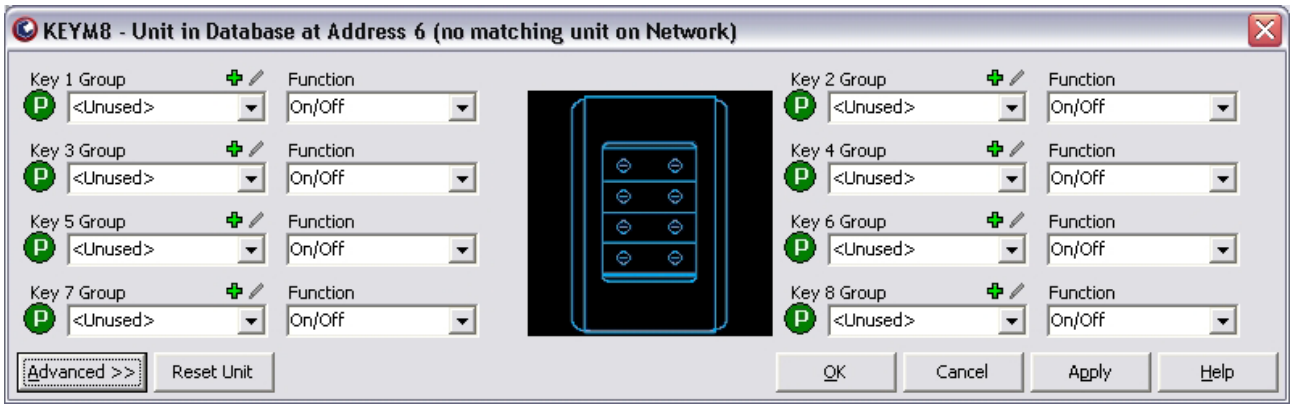


Figure 18 – A typical C-Bus® Neo Wall Switch Edit panel

Step 2: Set the Function Type to <Scene>

Click on the Function drop down arrow for the Button 1 (Key 1) Group and select the <Scene> function, as displayed in Error! Reference source not found..

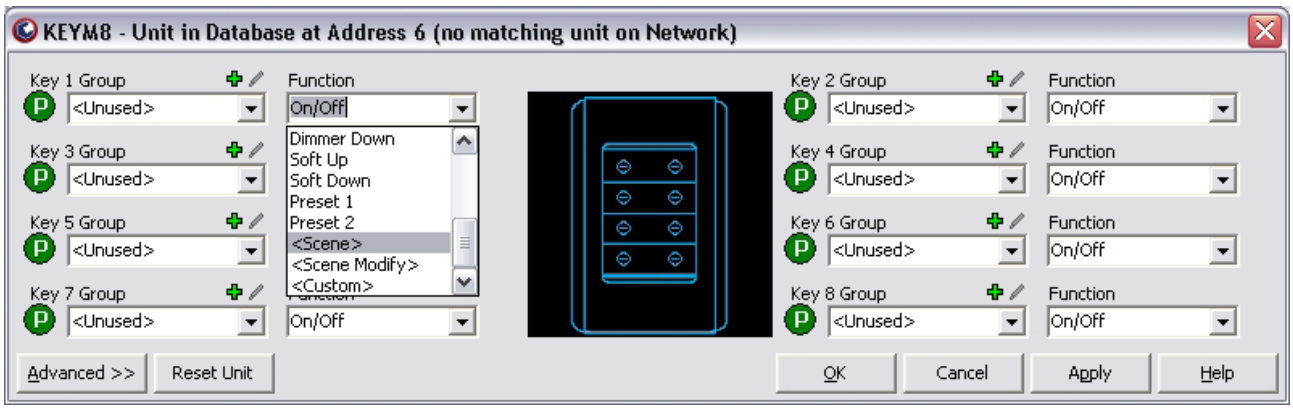


Figure 19 – Selecting the Scene function

The properties button appears next to the <Scene> function type, as shown in (Figure 18). The Button 1 (Key 1) Group changes from <unused> to Scene 1.

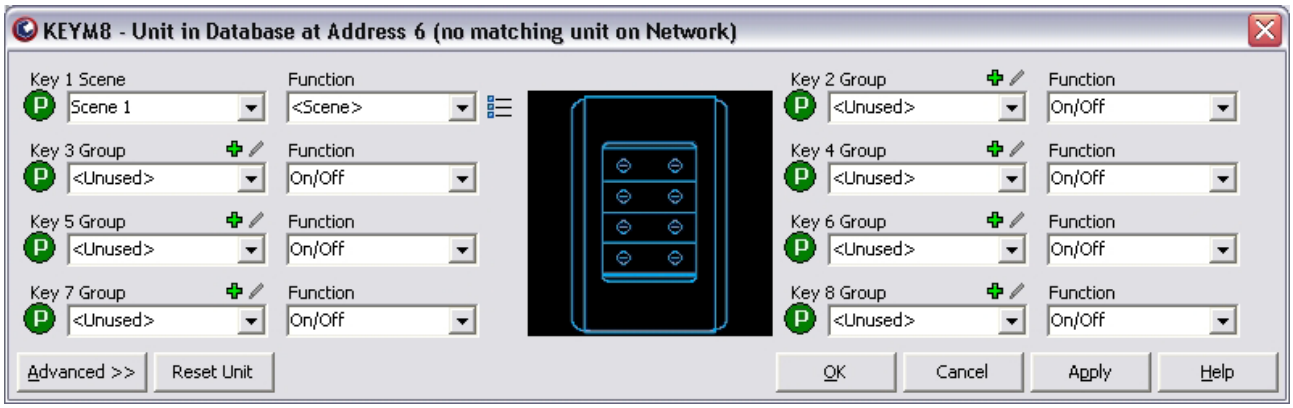


Figure 20 – Button 1 (Key 1) Group has been set to the <Scene> function

Step 3: Creating the Scene

Click on the properties button. You will be presented with the 'Define a Scene Button (Key)' panel (Figure 21). Here you can adjust the Ramp Rate which sets the speed at which levels will be applied when the scene is activated.

Click the Edit Scenes button to activate the Scene Manager.

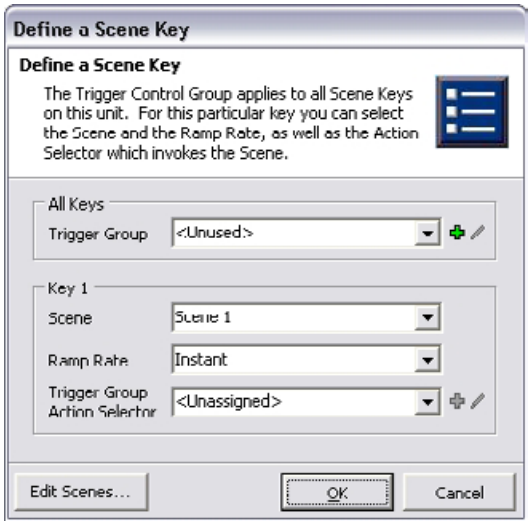

Define a Scene Key
Define a Scene Key
The Trigger Control Group applies to all Scene Keys on this unit. For this particular key you can select the Scene and the Ramp Rate, as well as the Action Selector which invokes the Scene.
All Keys
Trigger Group
<Unused>
Key 1
Scene
Scene 1
Ramp Rate
Instant
Trigger Group Action Selector
<Unassigned>
Edit Scenes...
OK
Cancel

Figure 21 – Defining a Scene Button

The Scene Manager is displayed in (Figure 22), with Scene 1 selected. From here you can create and edit any of the scenes which the unit contains. The 8 button Neo unit has a capacity of 8 scenes. These are listed on the left of the Scene Manager. Groups which can be controlled in the scene are listed on the right. You can add additional groups via the New Group button.

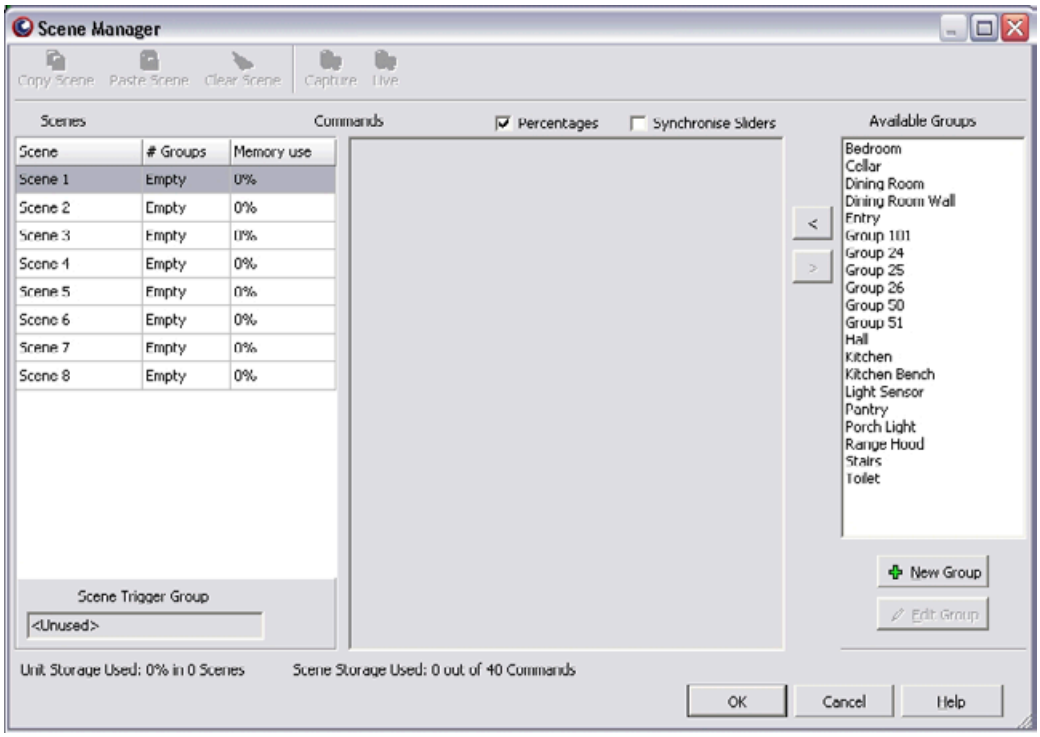


Figure 22 – The Scene Manager

Groups are selected from the list on the right and added to the selected scene by clicking on the button that points left. The level of each group is set by moving the slider. In (Figure 23) the Dining Room group has been added to Scene 1.

The Capture button lets you read the levels of the included groups live from a connected C-Bus® Network. When the Live button is selected, you can see changes in the levels of included groups on a connected C-Bus Network, as you adjust the sliders.

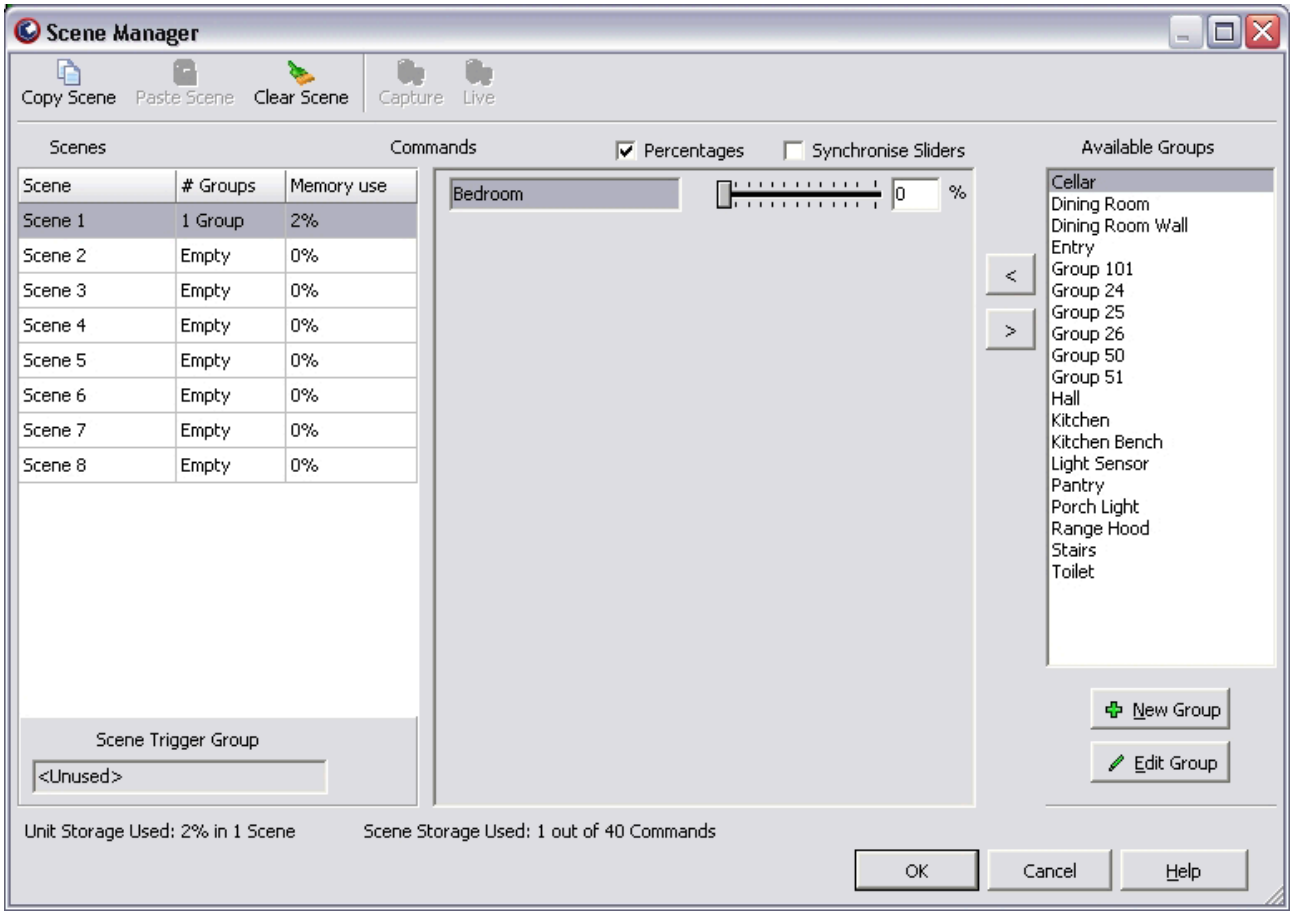


Figure 23 – The Scene Manager with one group added

In (Figure 24), Scene 1 includes six groups and uses 15% of the memory that is available for that individual scene. Each scene in the 8 button Neo® may include up to 10 group addresses.

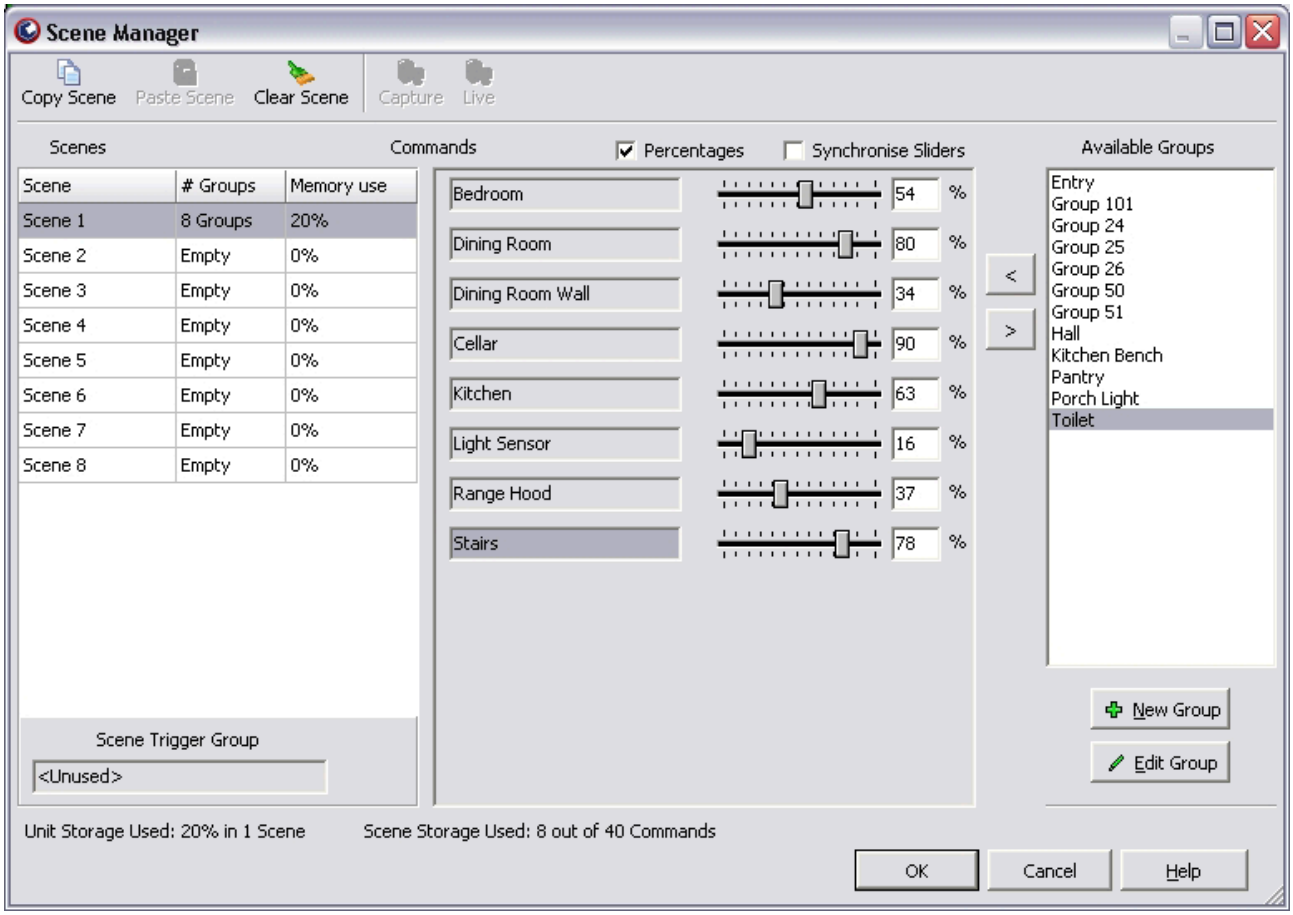


Figure 24 – A more Completed Scene

Step 4: Saving the Scene

Click on the OK button to save the scene. The 'Define a Scene Button (Key)' panel becomes visible again. It lets you change which scene will be used by the input button. Click OK on this panel also.

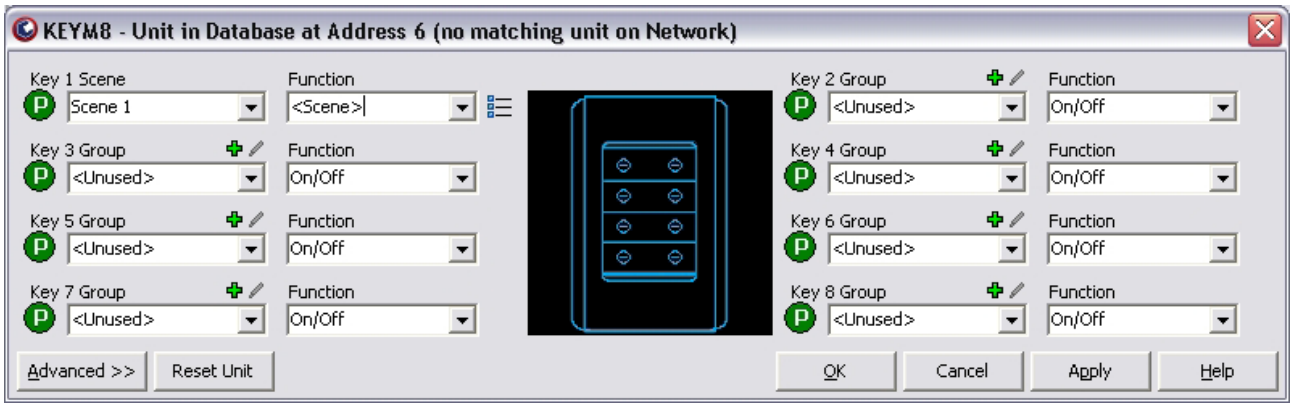


Figure 25 – The Scene has been saved

Click on the Save button to save the changes you made to the Neo® unit. You will be prompted to select where you want the changes to be applied (Figure 26). The changes can be applied to the Physical Unit, the Database or both.

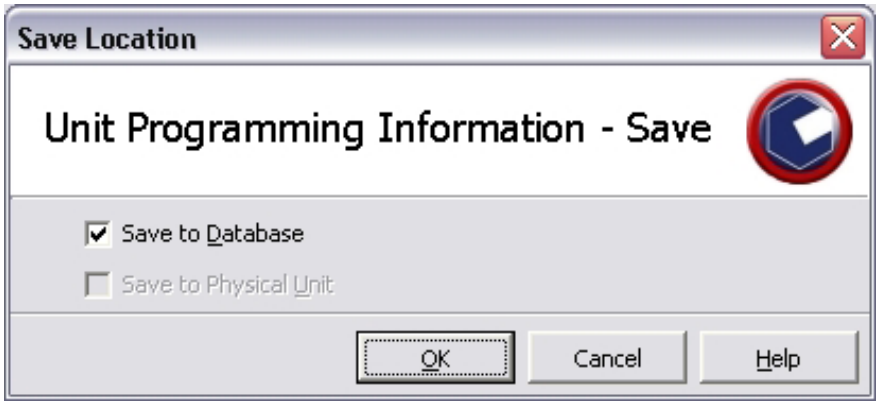
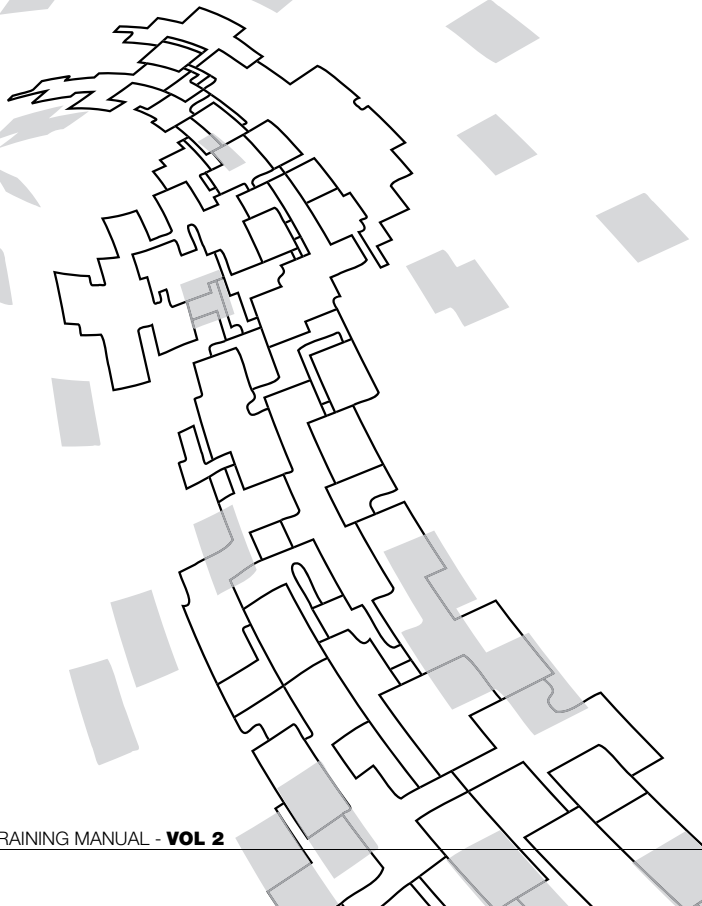


Figure 26 – Saving the programming information

Volume 2D
Dynamic Labelling



Scope

This manual aims to provide an installer with the basic skills needed to program and use the C-Bus® Dynamic Labelling Technology (DLT) Unit. A fundamental technical background is required.

To get the most out of this manual, be sure to:

- Read all chapters
- Perform all exercises.

Learning Outcomes

By the end of this module, you should be competent in:

- Programming the DLT
- Labelling the DLT
- Setting the clock.

1.0 Dynamic Labelling Technology Range

5055DL C-Bus® Neo® 'A' Series DLT (rectangular plate)

5085DL C-Bus Saturn 'A' Series DLT (rectangular plate, dual bevel)

Figure 1 - DLT Switch

1.1 Introduction

C-Bus 'A' Series Neo and Saturn DLT input units are a range of high end C-Bus switches with Dynamic Labelling Technology (DLT). Units feature 5 physical buttons, which control up to 8 control groups. The LCD screen displays labels and status information for each button/control group. Units have scene management and learn mode capability.

Labels can consist of text (in several languages) or graphics. They may also be changed dynamically by other C-Bus devices, (such as the C-Bus Multiroom Audio System), to reflect a change in functionality.

C-Bus DLT input units contain a clock. The time is displayed at the base of the display when the clock is enabled and the time has been set

1.2 Programming the DLT

The DLT is programmed using either learn mode or C-Bus Toolkit Software.

Programming the response of the DLT is similar to a Neo.

The text or graphics is programmed using a separate programming GUI and all DLTs on a Network are programmed together. This is achieved by making an association between a group address and text or graphic.

1.3 About DLT Broadcasting

Dynamic Labelling uses a one-way broadcast system to transfer Labels to all DLT units on a Network. This works very differently to the usual communications between Toolkit and C-Bus units, which is why you cannot edit DLT Labels on a unit-by-unit basis.

2.0 DLT GUI

Before we get into Languages and Labels, let's check out the DLT Unit. Select a DLT unit in either view and choose to 'Edit Unit'.

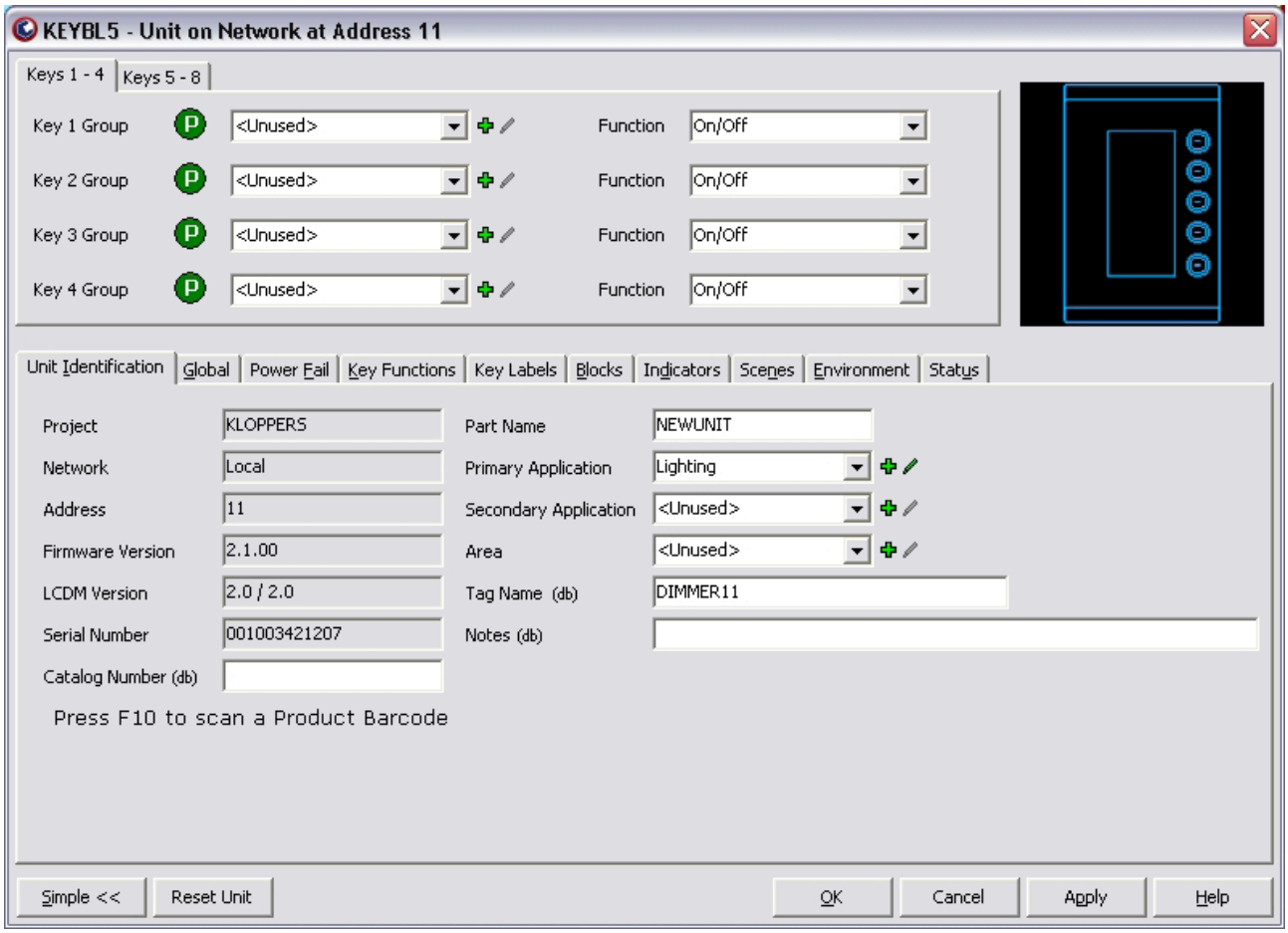


Figure 2 - DLT Programming GUI

The DLT and Neo® GUIs are very similar though there are a number of important differences. The first one you'll notice is that the keys are arranged vertically, with keys 1 to 4 on one tab and keys 5 to 8 on a separate tab. This is to reflect the physical design of the unit with the eight buttons arranged in two pages of four and one page being controlled at a time.

The Unit Identification, Power Fail, Key Functions and Scenes tabs are essentially unchanged from their Neo counterparts.

The DLT is capable of operating on two separate applications as a default the primary application is set to Lighting a second application can be selected if required.

To change a key between to the second application on a key click the green 'P'.

If a green 'P' is shown adjacent to the key group this indicates the Primary application has been selected.

If a blue 'S' is shown adjacent to the key group this indicates the Secondary application has been selected.

If a red 'M' is shown adjacent to the key group this indicates that Multiple applications have been selected, or in other worlds, the Key controls Groups in both the Primary and Secondary applications.

2.1 Global tab

DLT units don't have infrared but they've acquired the ability to have their keys disabled by a Group on the Enable Application, very effective for public areas or child lock implementations.

NOTE: Also ensure that the "Dynamic Labelling" option is checked, because otherwise the unit will not recognise the Labels you send to it.

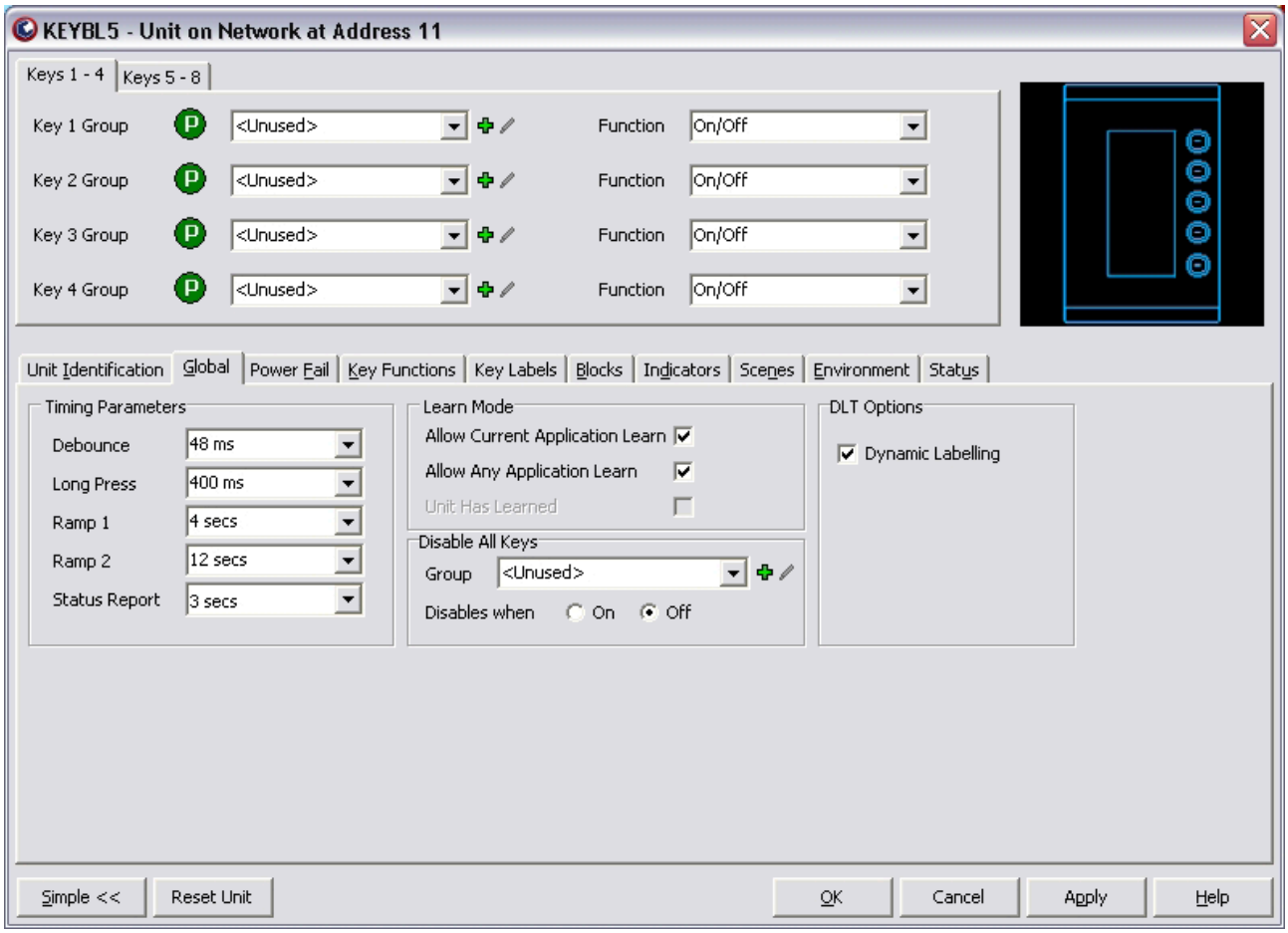


Figure 3 - Global Tab

Adding a group to the Disable All Keys section and selecting the radio button as Off causes the Keys on the plate to not operate when the Group is Off. Alternatively selecting the radio button as On causes the Keys on the plate to not operate when the Group is On.

2.2 Blocks tab

The Blocks tab provides an overview of which groups are assigned to which keys.

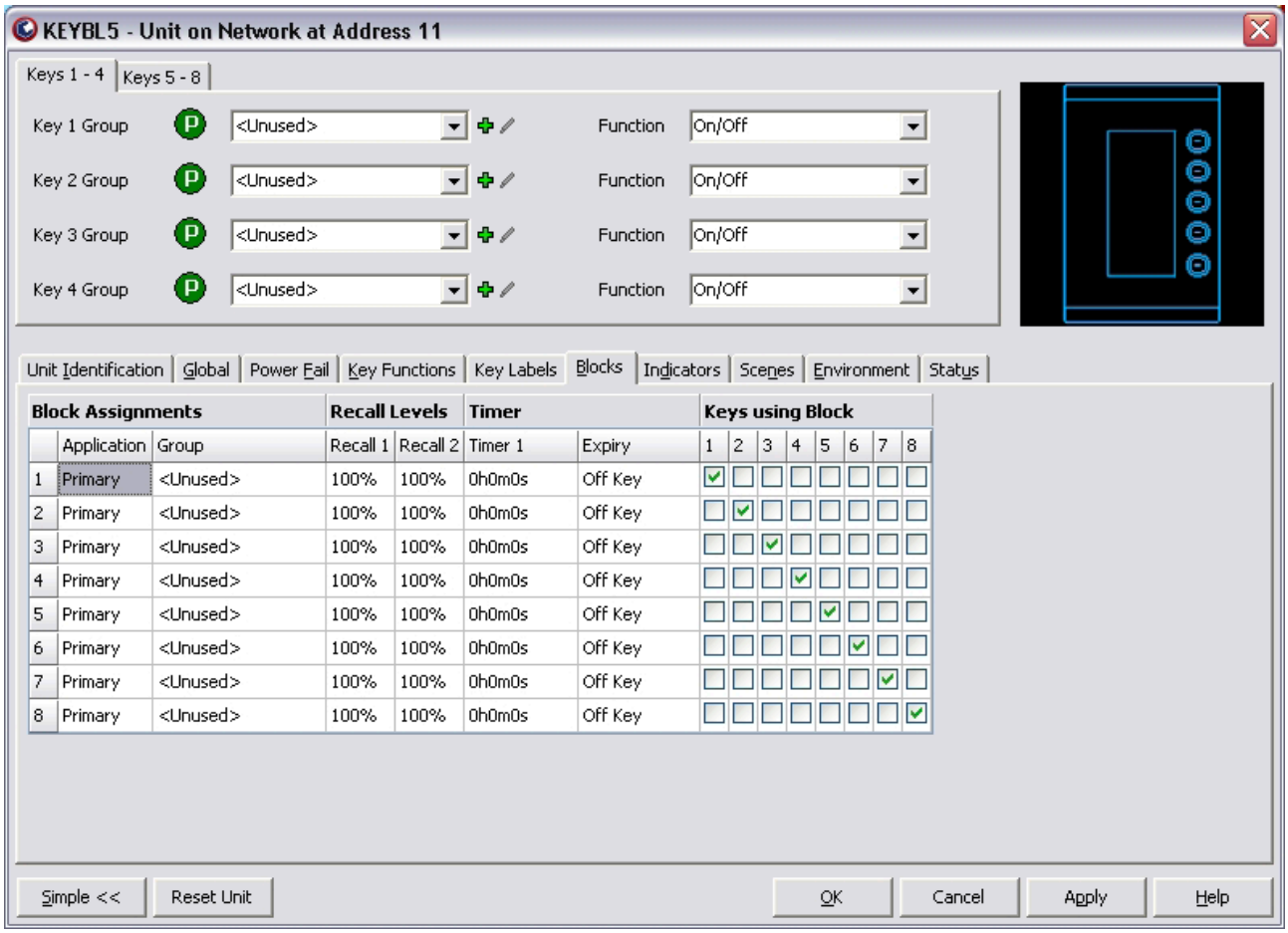


Figure 4 - DLT Blocks Tab

2.3 Indicators Tab

The “Change brightness after a key is pressed” as seen on a Neo® option has been altered into a 'Key Press Activity' concept, where pressing a key is followed by an Activity Period during which the indicator brightness is changed. In addition you may choose to have the DLT unit fall back to displaying the first page after this period ends.

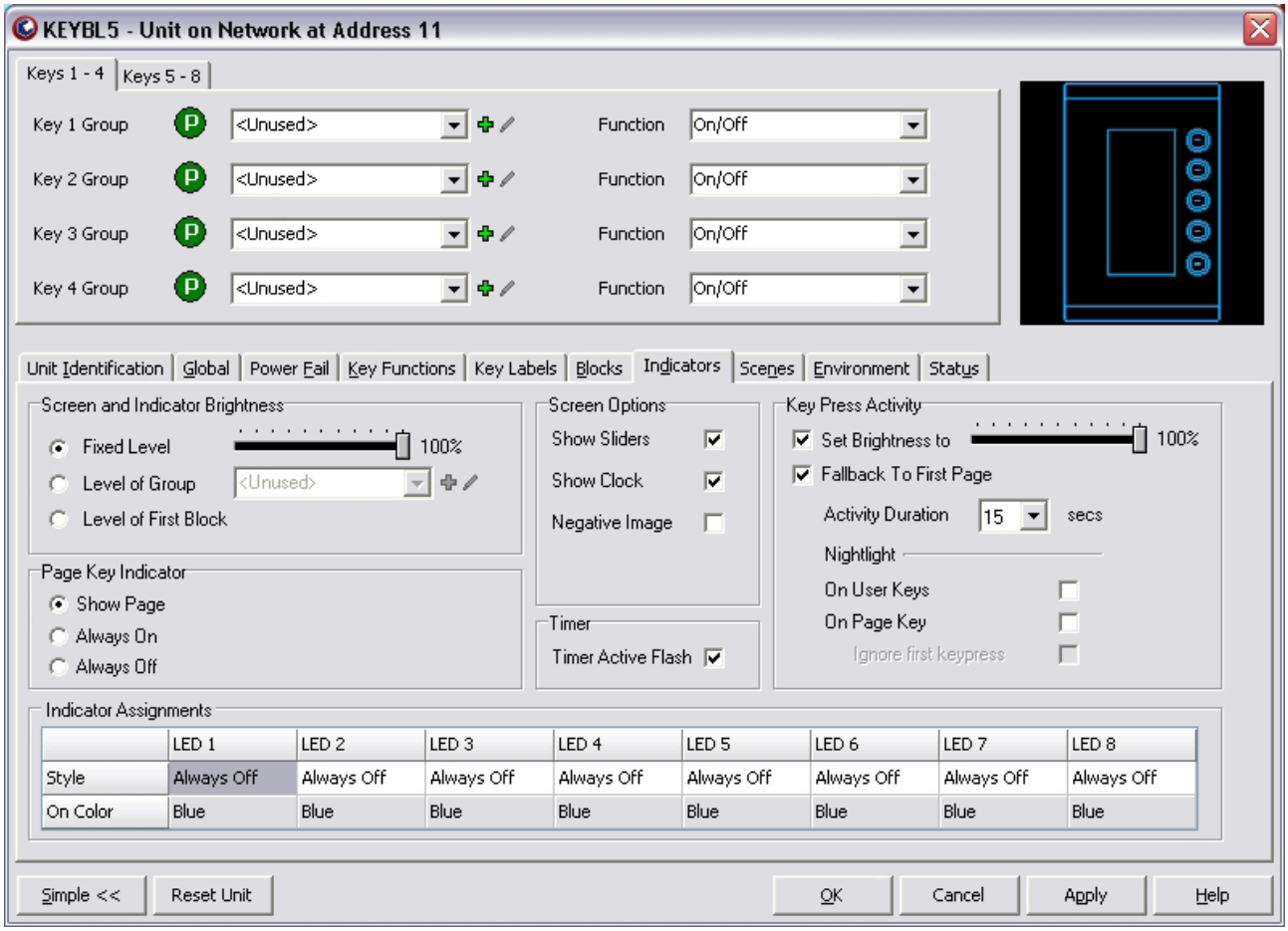


Figure 5 - DLT Indicators Tab

Screen Options allow the display to show or hide the level sliders or the clock, as well as inverting the display to its negative image of white on black. (Note: the clock is only for Display purposes and cannot be used for real time applications)

The nightlight feature can be activated separately on the four group-based keys and the page key.

The page key indicator can also be permanently on or off. Indicators are blue only and their style can be configured separately for each of the eight input keys.

3.0 About DLT Units

DLT Units (Dynamic Labelling Technology) contain a graphical display screen, which can display a label in association with each key on the unit. Labels can be a text string, pictographic symbols or a bitmap graphic.

3.1 Labelling Groups

We now want to attach relevant labels to the keys. To achieve this the DLT programming of the Groups above needs to be saved to both the Database and the Physical Network.

Navigate on the project manager to the Network level of the relevant project. You will now notice that on the right of the screen there is a button labelled DLT Labels.

Click on the DLT Labels Button and the following screen will appear

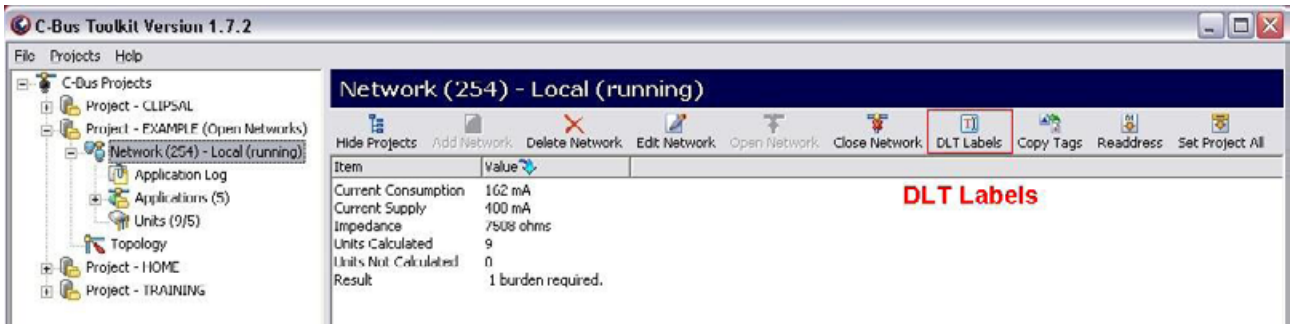


Figure 6 - DLT Labels Button

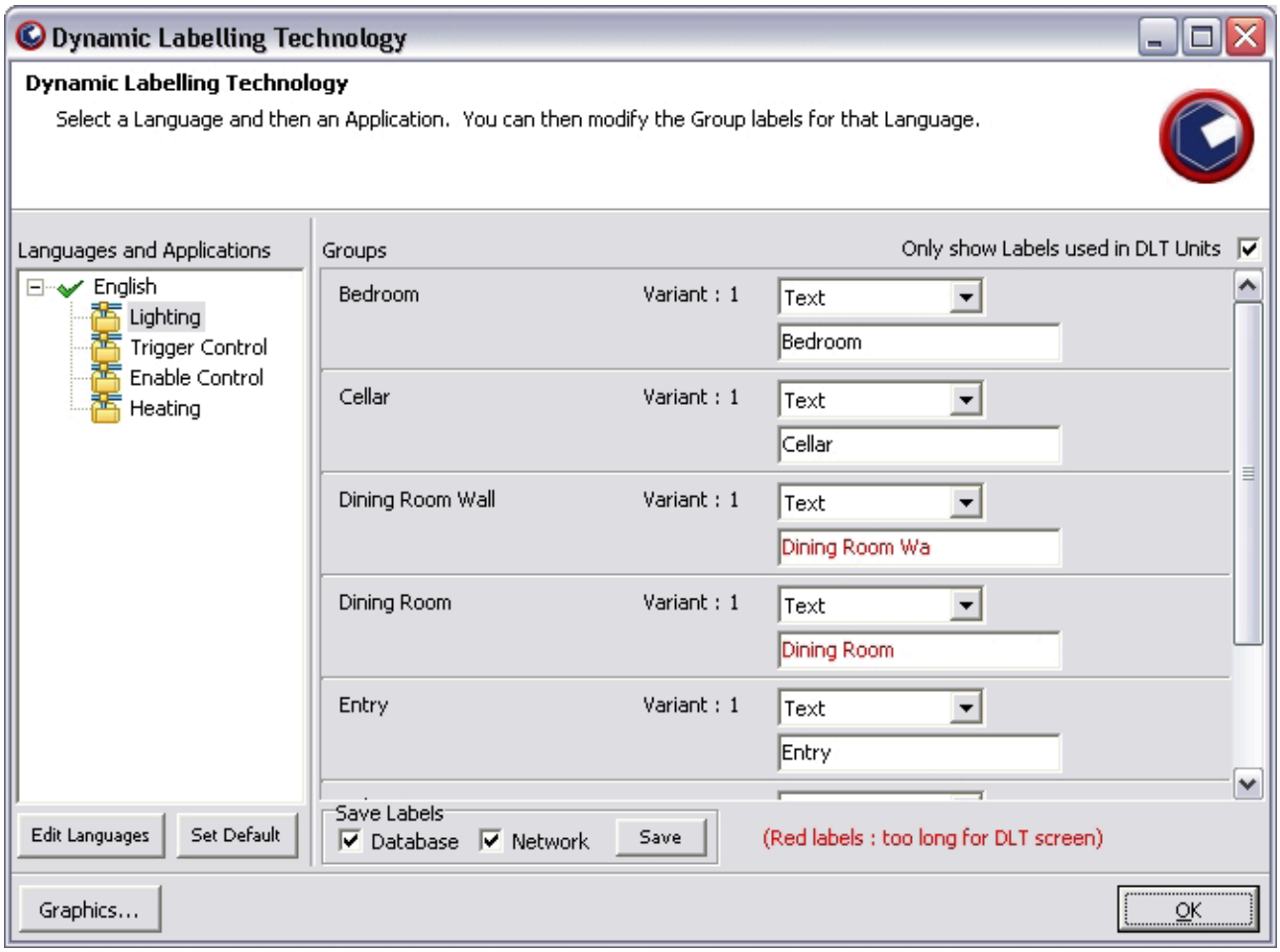


Figure 7 - Labelling DLT Groups

Select the English Language and Highlight the Lighting application, now press the set default button.

The option 'Only show Groups used in DLT Units' is checked by default. This ensures that only those Groups found on DLT units in the database and Network views are displayed, which is ideal for working with live Networks. In some cases you may wish to set up Languages and Labels before you have DLT units to apply them to, and you would need to uncheck this option in order to display all known Groups for the Application.

On the right of the screen you will notice that that there is a drop down box giving you the choice of Text or Dynamic Icon, for this example leave it on text. Beneath this is where you enter the text you wish to display for the relevant group. Initially the group address name is shown in this area and along side to the left in grey.

Select the empty field beneath the 'Text' type combo box for each Group and type in a Name, If the label turns red this indicates that the label is too long for the DLT screen. The 'Text' combo box may also contain other options, but we'll come to those later.

3.2 Labelling Scenes

We will now apply labels to these scenes. As before, navigate to the project manager onto the Network level of the relevant project. Press the DLT Labels button.

This time select the English Language and then the Trigger Control Application.

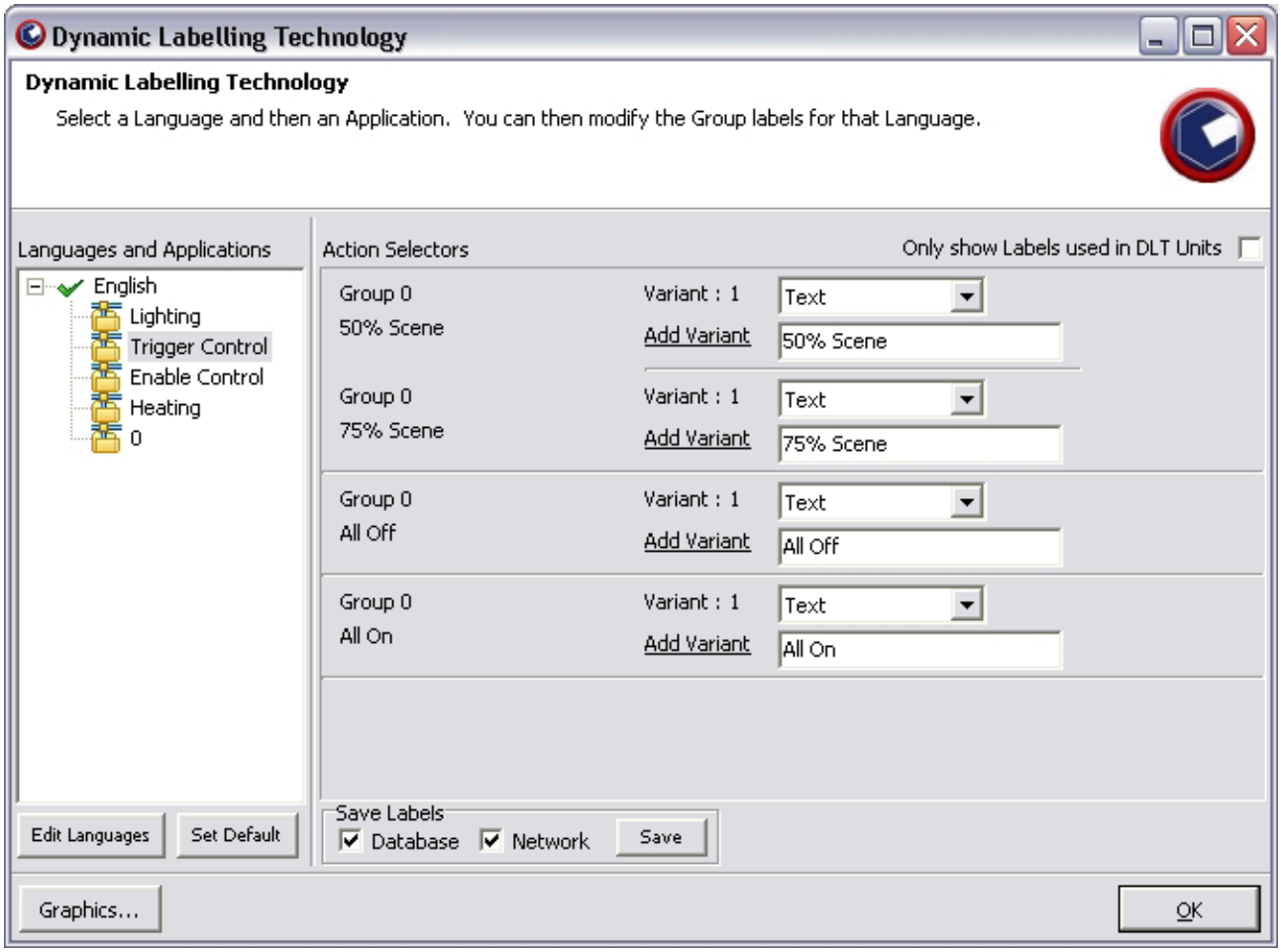


Figure 8 - Labelling DLT Scenes

4.0 Setting the Time

C-Bus® DLT input units contain a clock. The time is displayed at the base of the display when the clock is enabled and the time has been set. You can set the time from the DLT unit, or from certain other control units such as the C-Bus Colour Touch Screen. Setting the time on a DLT enables the clock on that unit. It also sets the time on other C-Bus units, which have their clocks enabled and reside on the same C-Bus Network.

The illustration shows how to set the time on a DLT unit:

- Hold down the fifth (bottom-most) button for 10 seconds, until the display changes to time set mode.
- Adjust the time. Press the Select (top) button to select which time property to adjust (hour or minute). The + and – (second and third) buttons increment and decrement the selected time property. Note that the time is displayed in 24-hour format, where 14:00 is equivalent to 2:00 pm.
- Press the OK (bottom-most) button to exit clock set mode.

You will need to set the time again after a power failure. This may not be necessary if a control unit capable of restoring the time is present on the C-Bus Network (such as the C-Bus Colour Touch Screen).

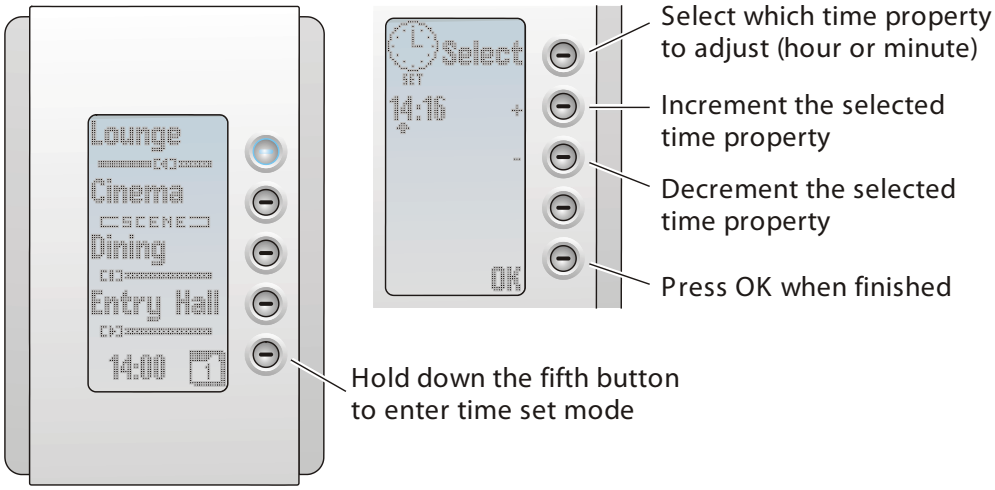
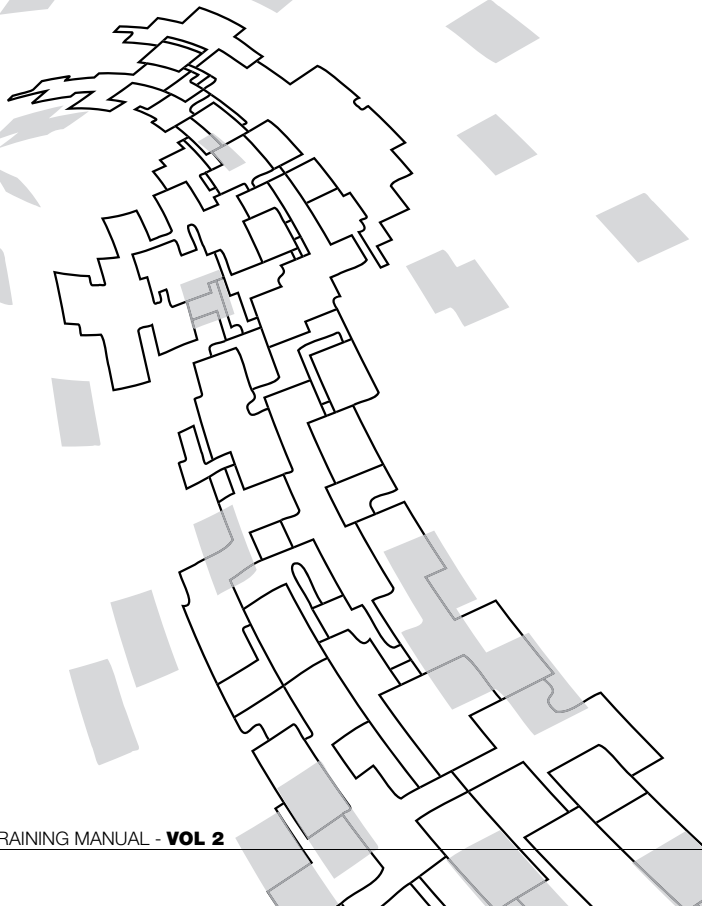


Figure 9 - Setting DLT Clocks

NOTE: You will need to set the time again after a power failure. This may not be necessary if a control unit capable of restoring the time is present on the C-Bus Network (such as the C-Bus Colour Touch Screen).

Volume 2E
Network Bridges



Scope

This manual aims to provide an installer with the basic skills needed to program and use The C-Bus® Network Bridges. A fundamental technical background is required.

To get the most out of this manual, be sure to:

- Read all chapters.

Learning Outcomes

By the end of this module, you should competent in:

- Setting up multiple Networks
- Configureuring Network Bridges.

1.0 Network Bridges Introduction

The C-Bus® DIN Rail mounted Network Bridge, is a Network support device that provides a communication channel between C-Bus units on separate Networks. This makes programming and monitoring of C-Bus devices on remote Networks possible from a single point.

The Network Bridge consists of two identical halves, each needing to be individually programmed with their own operating parameters.

The Network Bridge serves the following functions:

- Provides electrical isolation between adjacent Networks
- Allows messages to pass between Networks
- Provides a path for remote programming of units across Networks
- Provides a Network burden
- Provides a system clock for data transmission synchronisation.

The Network Bridge should be used under the following conditions:

- When the total current required to run the Network exceeds 2A
- When the number of C-Bus units exceeds 100 units
- When the total cable length in the installation exceeds 1000 metres
- When there is a requirement to provide separation between Networks, such as in the case of a multi storey building where a Network Bridge is used between floors to provide segregation.

A Network Bridge providing electrical isolation does not permit power transmission through the device. Therefore separate power supplies are required on both sides of the bridge.

1.1 Capabilities

The C-Bus® Network Bridge allows:

- Relaying of messages between Networks, to allow all Units on multiple Networks within the one installation to be programmed and monitored from a central location
- Transmission of On, Off and Ramp to Level Commands, to allow the control of Output Units on one Network by Input Units on another. Units across several Networks can be assigned the same Group Address to provide this high level of control.

1.2 Limitations

The C-Bus Network Bridge has several limitations including:

- The MMI Status Report cannot be transferred across a Bridge and therefore an Input Unit controlling a distant Output Unit over a Bridge cannot automatically correct itself
- As a Bridge can only send messages to one other Network as well as the adjacent Network, you are limited in inter-Network control when Bridges are used in cascade form
- The maximum number of Network Bridges that can be cascaded is six (in-series). An alternative Network Topology will be required to interconnect more than seven Networks.

1.3 Construction

The C-Bus® Network Bridge consists of two functionally and electrically independent systems. Each system consists of a communication interface together with an associated micro-controller, which is powered by the Extra Low C-Bus voltage from the Network to which it is connected.

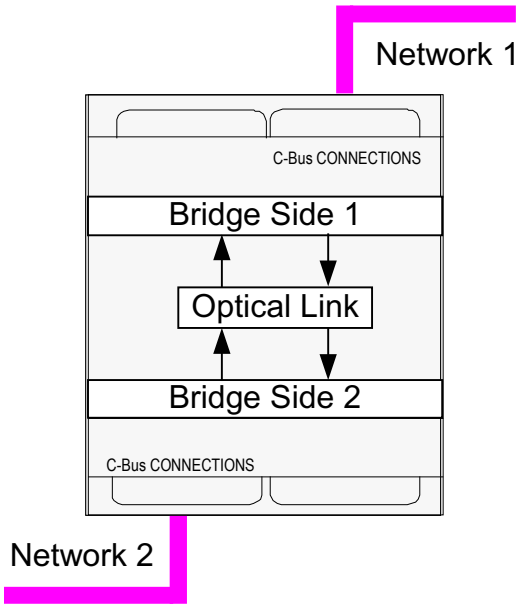


Figure 1 - Network Bridge Systems

Each Network Bridge provides optically isolated communication between sub Networks, so the reliability of the overall system will not be impaired by introducing bridges.

2.0 Network Topology

The Network topology is the connection scheme between Networks. C-Bus® allows up to 7 Networks in depth (i.e. 6 bridges), but to minimise transmission delays, Network depth should be minimised. This is illustrated in the topologies below. Which can be found at the bottom of the tree for a particular project.

On the computer screen the physical Network cable is represented by a Pink line and the square boxes with the diagonal line indicating the bridge.

The Topology is drawn for you by the software, dependent on what bridges are shown in the units on the Database

2.1 Daisy Chain

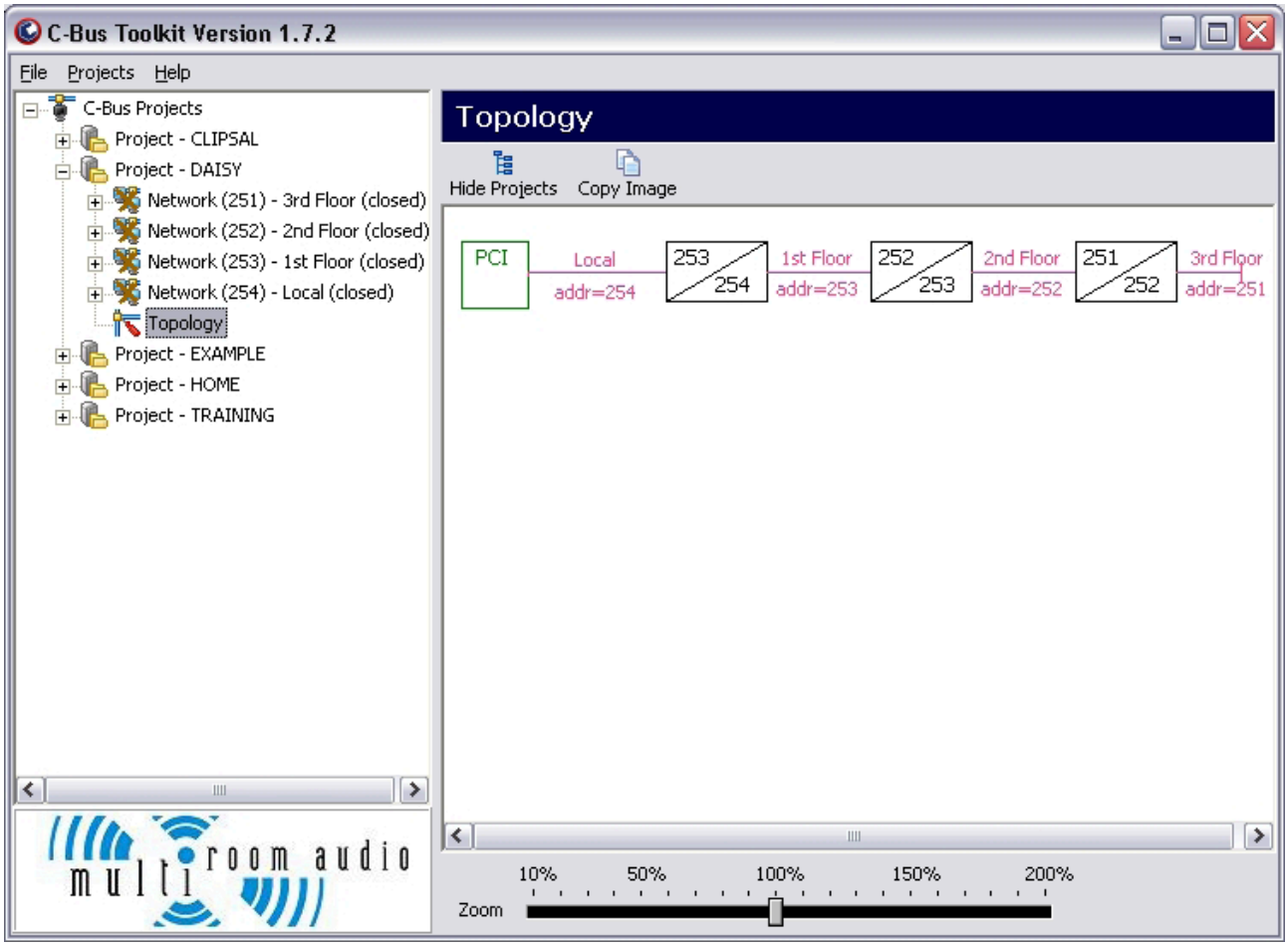


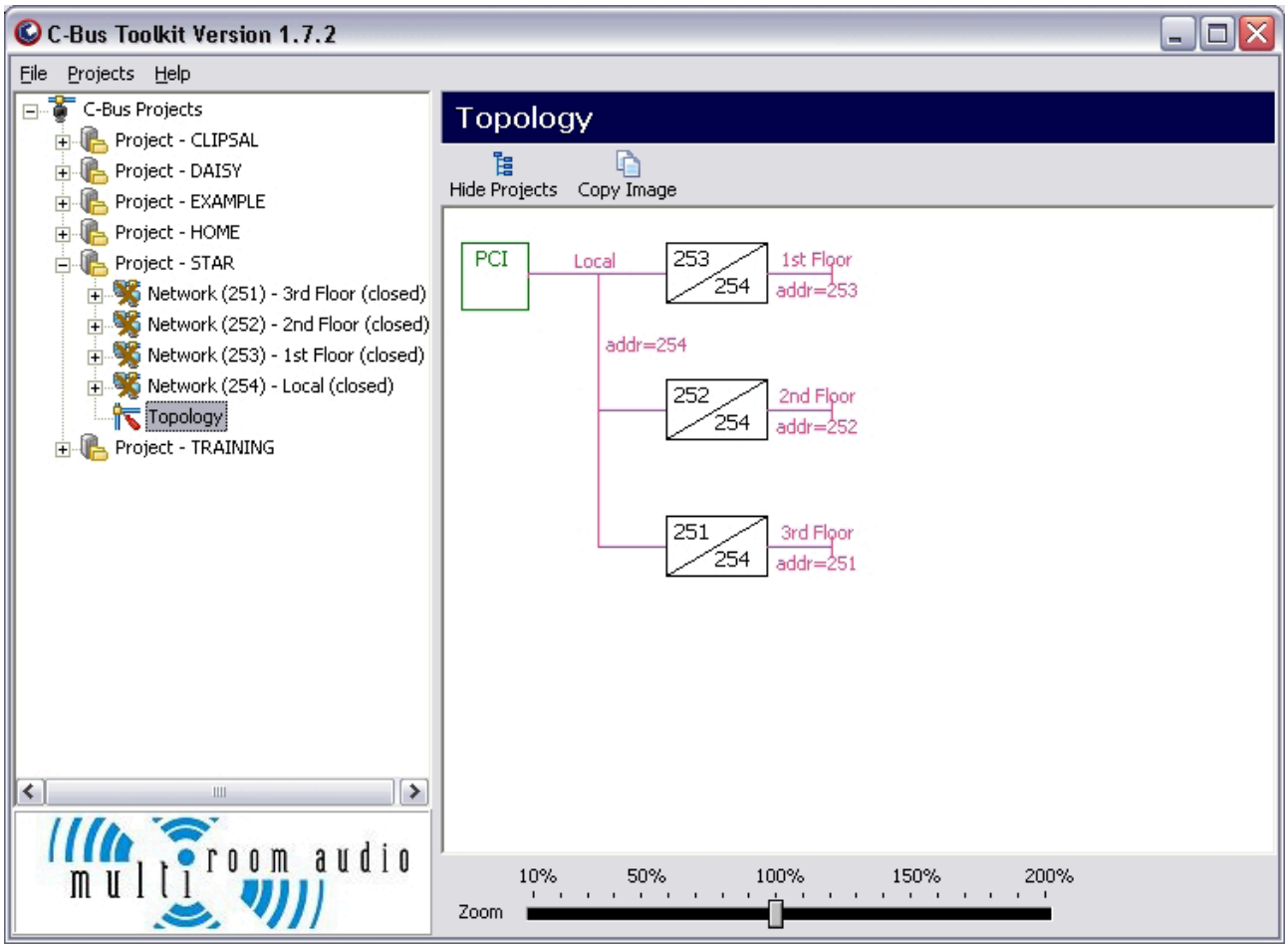
Figure 2 - Daisy Chain Topology

Figure 2 Illustrates a project that contains four Networks wired in series (Daisy Chain)

For messages to be sent from the Network (251) 3rd floor to Network (254) ground floor must pass through 3 bridges.

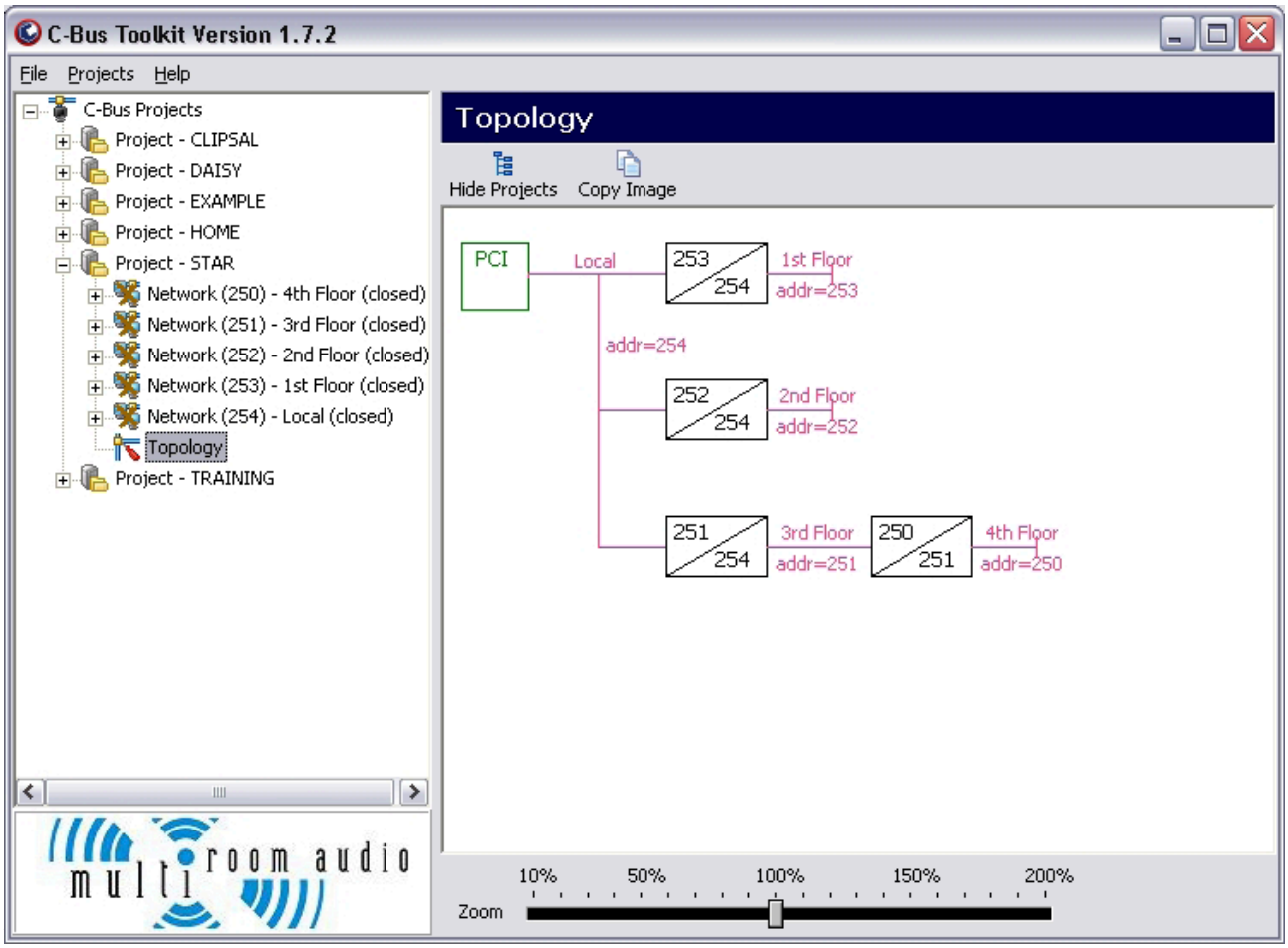
2.2 Star

(Figure 3) illustrates 4 Networks (3 bridges) with minimised depth. No message passes through more than one bridge to get to the Local Network (254) from a remote Network (Network (253), Network (252) or Network (251).



2.3 Combination

(Figure 2) shows a DAISY CHAIN configured Network. Figure 3 shows a STAR configured Network. It should be noted that a COMBINATION of star and daisy chain could be implemented. Below in (Figure 4) shows one possible combination.



As can be see Network (253) 1st Floor, Network (252) 2nd Floor and Network (251) 3rd Floor are STAR connected to Network (254) Ground Floor. In addition to this Network (250) 4th Floor is DAISY CHAINED with Network (251) 3rd Floor. In this case a message from Network (250) 4th Floor to Network (254) Ground Floor MUST pass through Network (251) 3rd Floor, therefore requiring the messages to pass across 2 bridges.

It should be noted that if required a topology that loops back on itself (ring) can be setup by adding additional bridges to the Network with the correct addresses.

3.0 Multi-Network Project

A multi-Network project may be defined at the onset via the Project Manager.

Starting a new project, and adding the necessary number of Networks achieves this.

On the project manager side of the screen highlight 'C-Bus® projects' and then Press the Add Project Button, this will bring up the following box. Enter a project name with a maximum of 8 characters.

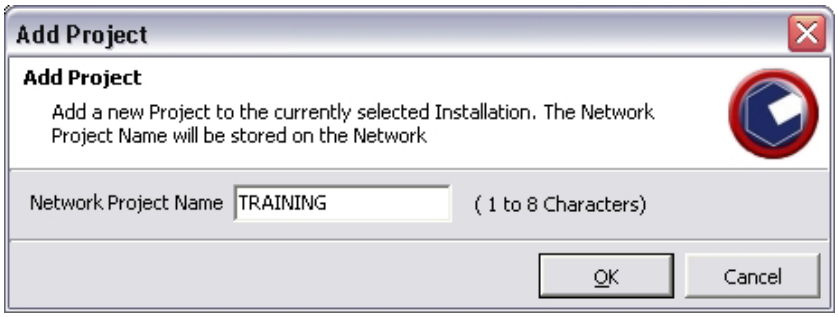

Add Project
Add Project
Add a new Project to the currently selected Installation. The Network Project Name will be stored on the Network
Network Project Name
TRAINING
(1 to 8 Characters)
OK
Cancel

Figure 5 - Add New C-Bus Project

Press the OK button and you will be asked *'Do you want to add a Network to the new Project'.* Answering Yes will allow the addition of your first Network, which as a default will be given a Network address of 254.

3.1 Enter 1st Network Details (Network 254)

The details for the new Network will need to be entered.

- The Network Name helps identify the Network rather than using the address
- Select the relevant type of connection and Address.

There are many methods of communicating with a C-Bus® Network.

(Figure 6.0) shows a serial connection using Com1. This is the most common method and the easiest to setup.

Figure 6 - Network Details

Another method of connecting to C-Bus® is by the use of a Computer Network Interface (CNI) (Figure 5.1) shows a CNI connection using an IP address and relevant Port.

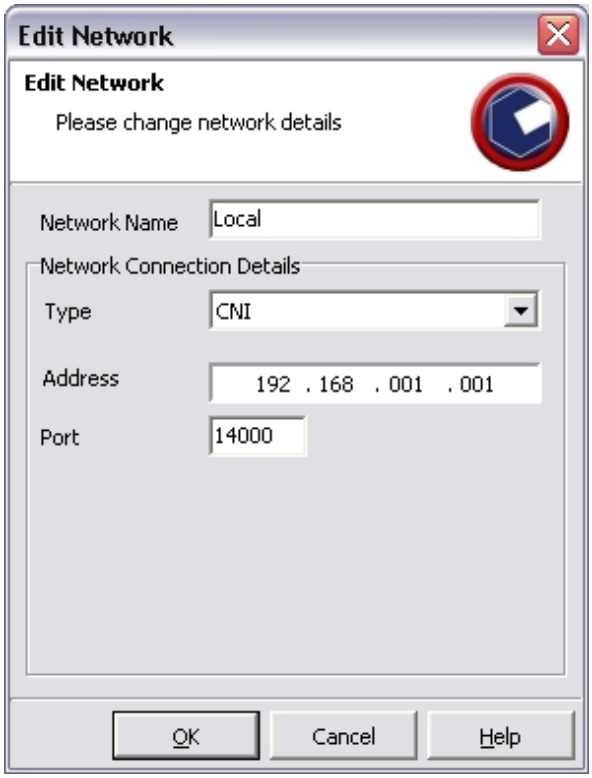


Figure 7 - CNI Network Setup

Click on OK to confirm your choice of Network connection. At this point your project consists of one Network.

3.2 Add additional Networks

Check that the relevant project is highlighted on the project manager.

Press the Add Network button a similar box to (Figure 4.0) will appear.

Enter the details for this Network

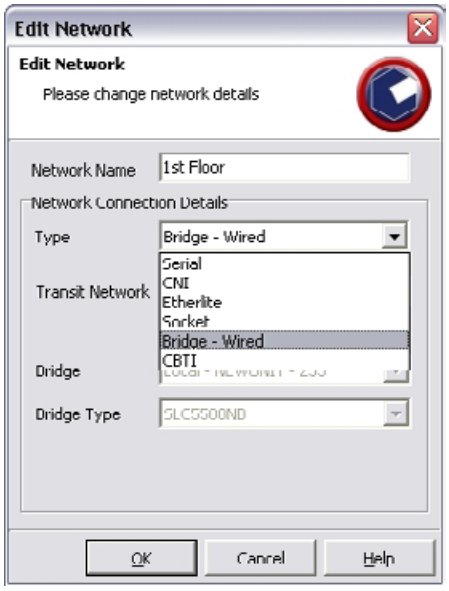


Figure 8 - Selecting a Network Bridge

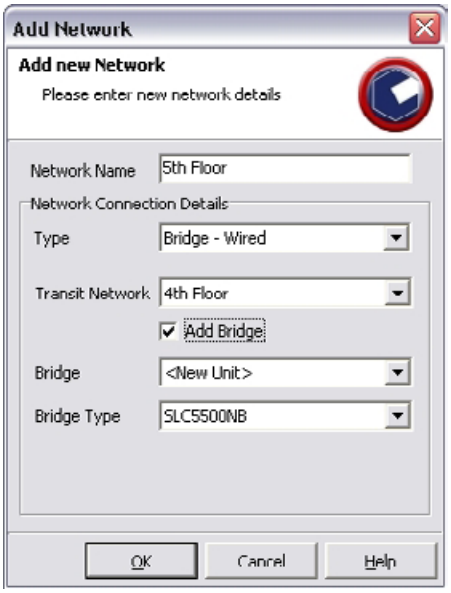


Figure 9 - Add New Network

When Bridge – Wired is selected the box will change allowing additional bridge Network info to be entered. (Figure 9)

The Transit Network is the Previous Network that is connected to the bridge with regard to where the PC is located.

Ticking the Add Bridge box automatically adds a bridge on both Networks with the correct unit address to allow communication. Click OK.

After you have added the Network bridge the following box (Figure 7) will appear which requests you to enter the Serial Number and/or Tag of both sides of the bridge. Entering this information helps quickly identify a particular bridge on larger Networks.

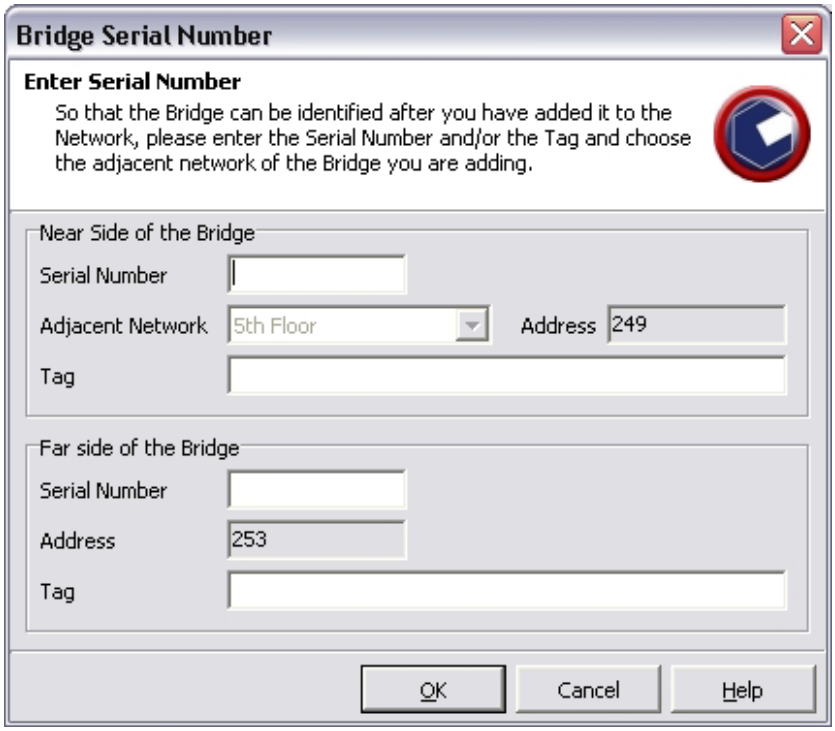


Figure 10 - Bridge Serial Number

Network Addresses are determined by the unit address of the other side of the bridge that is connected to this Network.

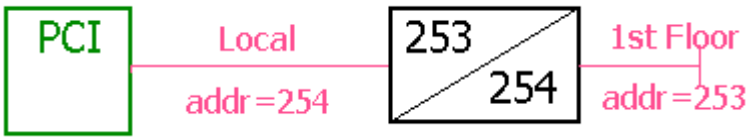


Figure 11 - Network Topology Layout

Note that the Local Network is address = 254, the bridge is represented by the box with the diagonal line through it. The bridge on the opposite side to Network 254 has the unit address of 254.

This can be explained an alternative way, consider an adjoining door between two hotel rooms, the door in room 254 would have the adjacent rooms number on it, hence showing where you are going. This is the same with the Network bridges the unit address identifies the Network on the other side.

Additional Networks can be added as required by following the same procedure.

3.3 Alternative Method Of Adding Additional Networks

Additional Networks can be added to a project when the bridge is physically connect to the Network. This method requires that the bridge is correctly addressed with regard as to the address of the Network it connects to. Using the Readdress button allows the altering of the unit address.

Highlight the Bridge on the Network and you will notice that the button make Networks becomes available to be used.

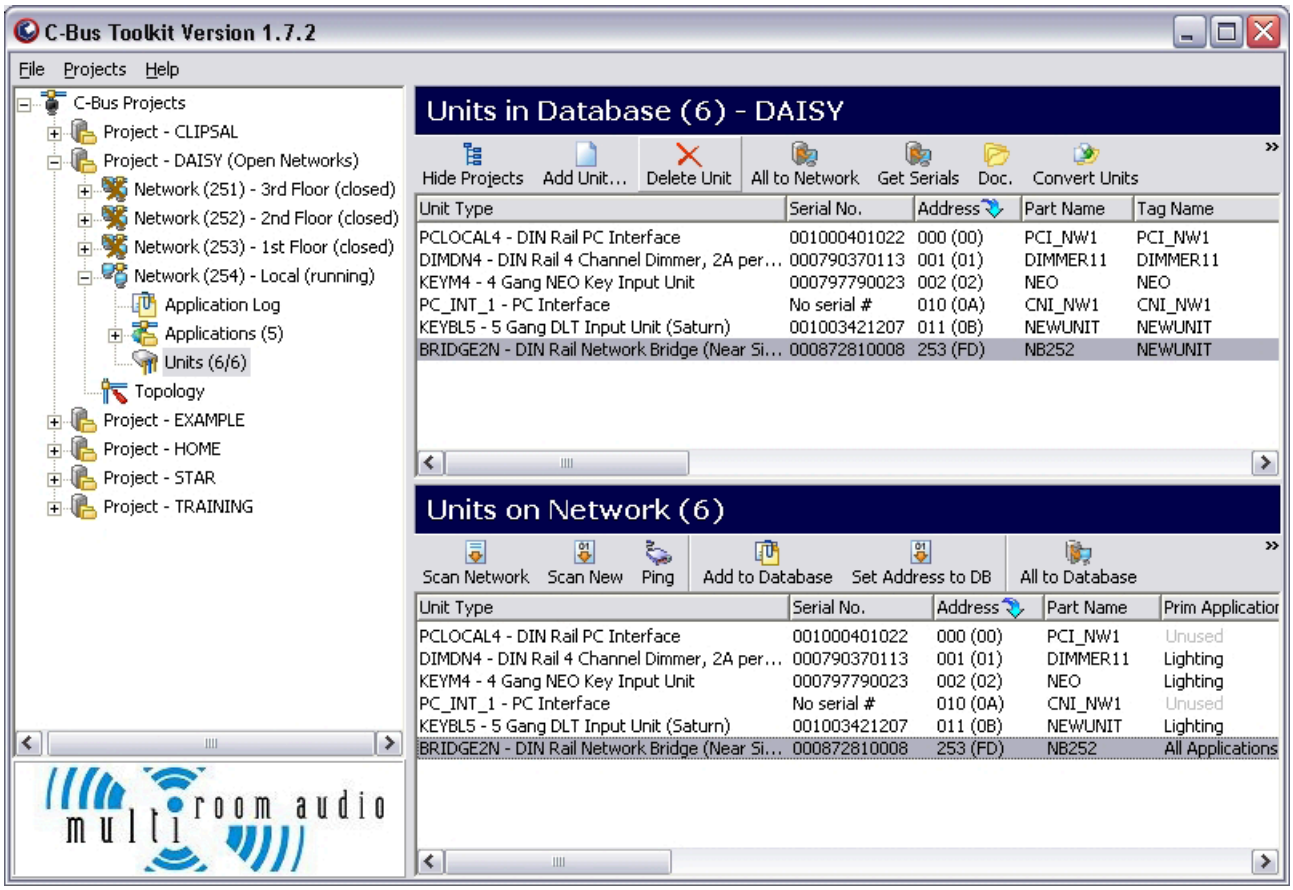

C-Bus Toolkit Version 1.7.2
File Projects Help
C-Bus Projects
Project - CLIPSAL
Project - DAISY (Open Networks)
Network (251) - 3rd Floor (closed)
Network (252) - 2nd Floor (closed)
Network (253) - 1st Floor (closed)
Network (254) - Local (running)
Application Log
Applications (5)
Units (6/6)
Topology
Project - EXAMPLE
Project - HOME
Project - STAR
Project - TRAINING
Units in Database (6) - DAISY
Hide Projects Add Unit... Delete Unit All to Network Get Serials Doc. Convert Units
Unit Type Serial No. Address Part Name Tag Name
PCLOCAL4 - DIN Rail PC Interface 001000401022 000 (00) PCI_NW1 PCI_NW1
DIMDN4 - DIN Rail 4 Channel Dimmer, 2A per... 000790370113 001 (01) DIMMER11 DIMMER11
KEYM4 - 4 Gang NEO Key Input Unit 000797790023 002 (02) NEO NEO
PC_INT_1 - PC Interface No serial # 010 (0A) CNI_NW1 CNI_NW1
KEYBL5 - 5 Gang DLT Input Unit (Saturn) 001003421207 011 (0B) NEWUNIT NEWUNIT
BRIDGE2N - DIN Rail Network Bridge (Near Si... 000872810008 253 (FD) NB252 NEWUNIT
Units on Network (6)
Scan Network Scan New Ping Add to Database Set Address to DB All to Database
Unit Type Serial No. Address Part Name Prim Applicatior
PCLOCAL4 - DIN Rail PC Interface 001000401022 000 (00) PCI_NW1 Unused
DIMDN4 - DIN Rail 4 Channel Dimmer, 2A per... 000790370113 001 (01) DIMMER11 Lighting
KEYM4 - 4 Gang NEO Key Input Unit 000797790023 002 (02) NEO Lighting
PC_INT_1 - PC Interface No serial # 010 (0A) CNI_NW1 Unused
KEYBL5 - 5 Gang DLT Input Unit (Saturn) 001003421207 011 (0B) NEWUNIT Lighting
BRIDGE2N - DIN Rail Network Bridge (Near Si... 000872810008 253 (FD) NB252 All Applications
multi room audio

Figure 12 - Toolkit Showing Network Bridge

Pressing this button will automatically add a Network to the project, this will be seen on the project manager side of the screen. (Note the Network address is the same as the unit address of the bridge on the other Network).

As this is being done live the new Network is added and is opened and running ready to be used.

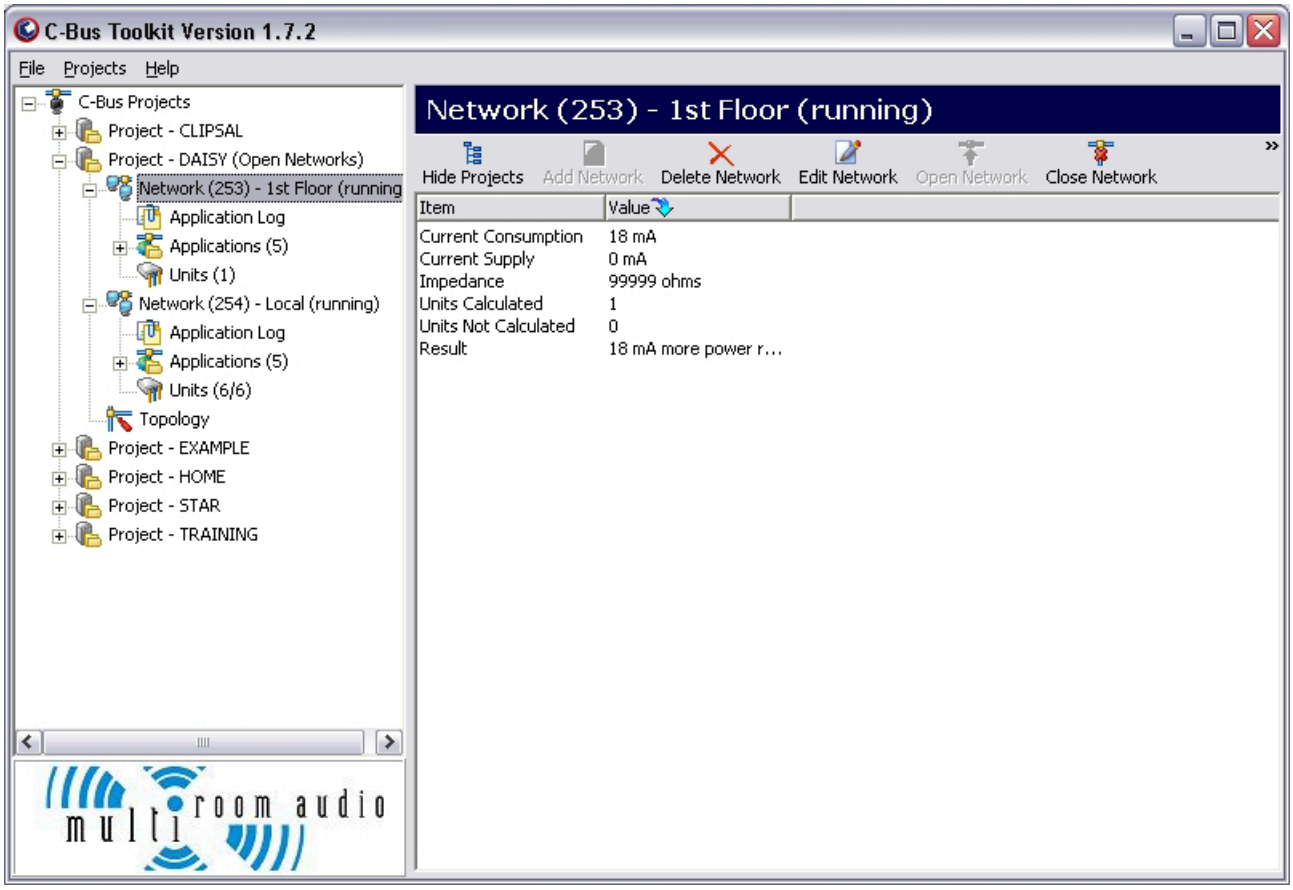


Figure 13 - Opening a Remote Network

It is now very important that the new Network is scanned and the Network bridge address altered to match the Network address on the other side of the bridge.

4.0 Network Bridge GUI

The Network Bridge GUI is somewhat similar to other C-Bus® GUIs.

Unit Identification tab is where details about the Bridge are entered.

The Connection tab allows programming of which applications will be passed across the bridge and to what destination Networks.

The Global tab is where the Clock and Burden are set on. It is suggested that unless there is no alternative the Clock and Burden are selected elsewhere on the Network, for example on an output unit.

The Status Tab will only display information when viewed from a live Network connection.

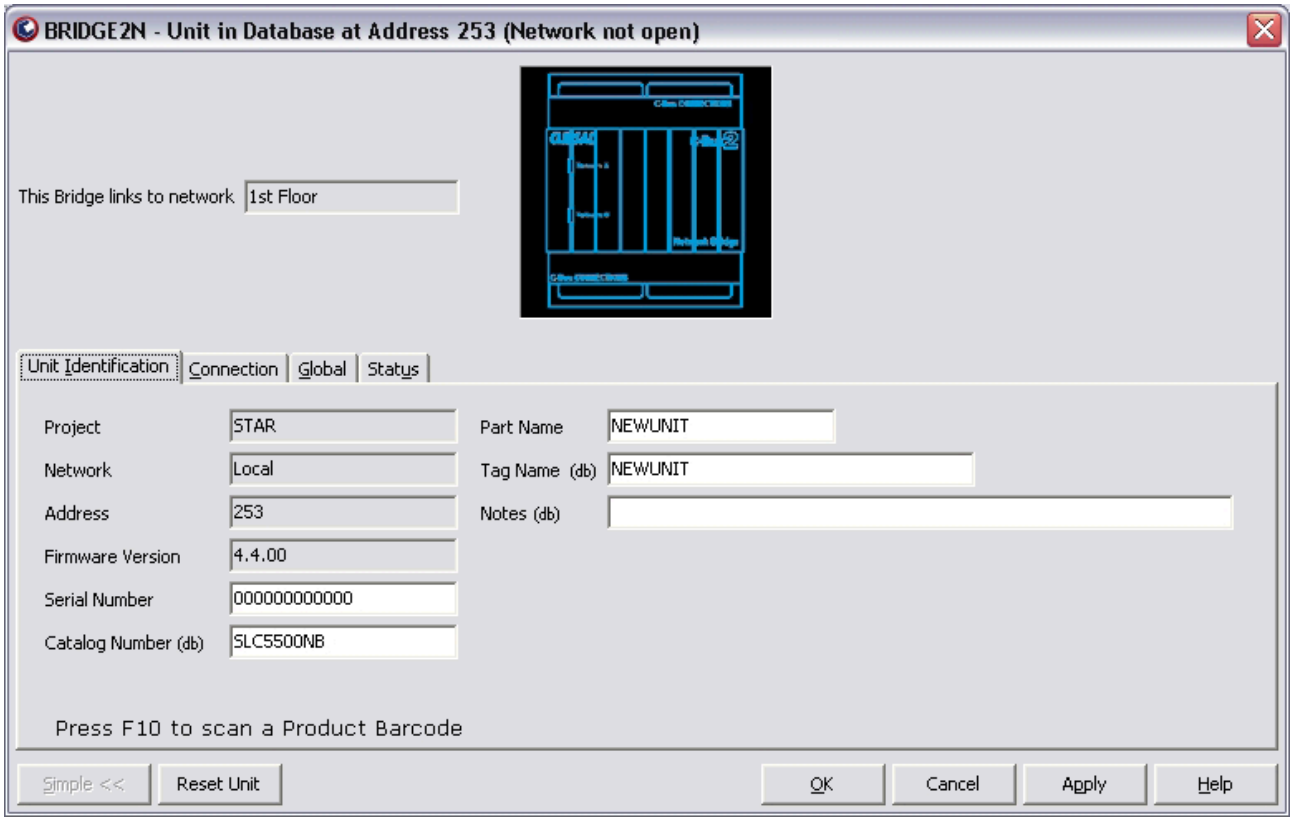


Figure 14 - Unit Identification Tab

4. 1 Connection Tab

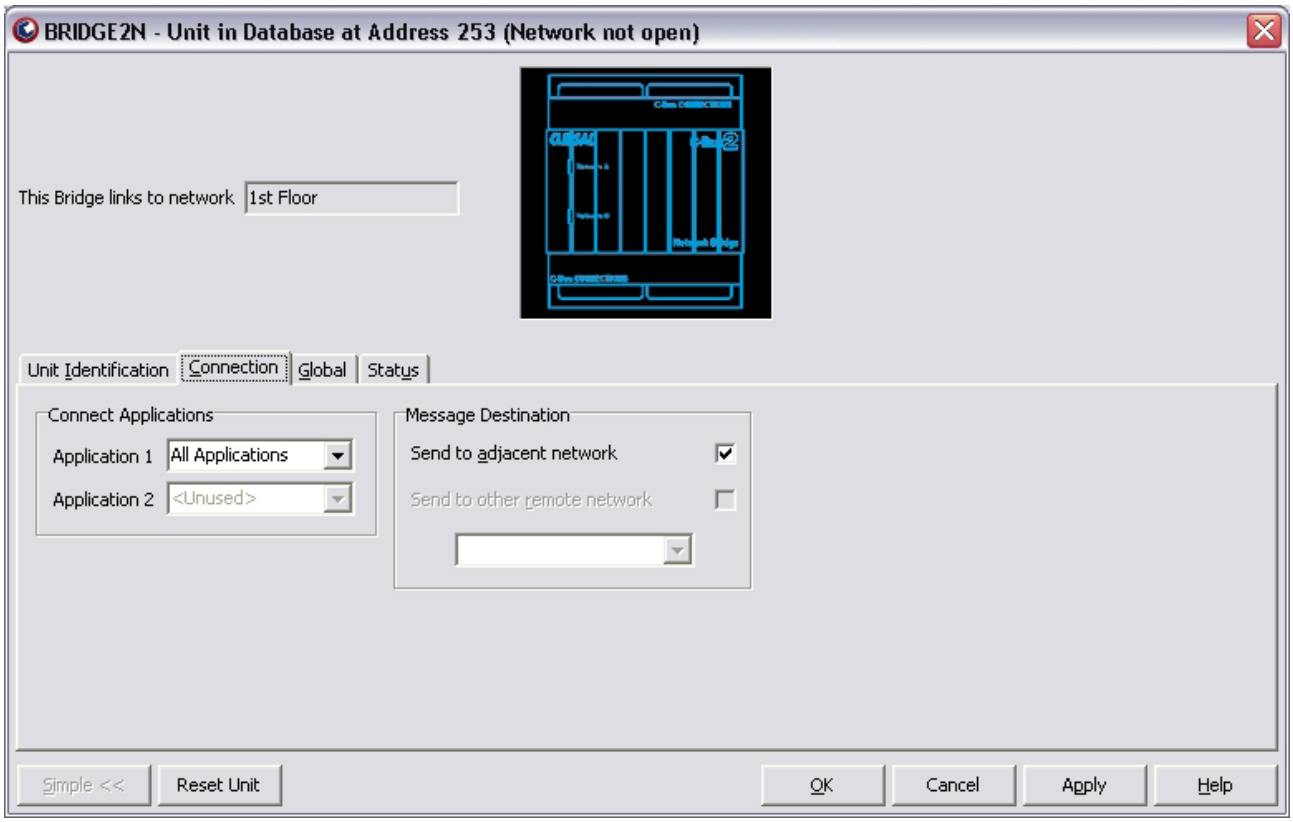


Figure 15 - Connections Tab

4.2 This Bridge links to Network

This option shows which Network the other side of the bridge is physically connected to.

4.3 Connect Applications

The default setting of the bridge is to allow all applications to pass through the bridge, however if you do not want to send all applications through the Network it is possible to send just two Applications through the bridge.

4.4 Message Destination

If 'Send to adjacent Network' is selected the messages will be sent to the Network the bridge is connected to.

If 'Send to other remote Network' is selected it is possible to send the messages through a second bridge or a series of bridges to a remote Network.

The user can choose which Network the messages are being sent to.

5.0 Group Addresses

If the Network bridge is configured for two Networks to communicate to each other care should be taken when programming the with regard to Group addresses.

The GA hexadecimal value is the description that is sent across a bridge; hence if two or more Networks have the same GA and messages are passed, then loads will be controlled on another Network when it is not required.

For example on the local Network there could be a load with a group description of Bathroom Light with GA 01 and on the Far Network with a group description of Main Bedroom light with GA 01. If someone walked into the Bathroom and turned on the Bathroom light the Main bedroom light would also go on.

If Networks are configured to talk to each other essentially it is one single Network so the number of unique GAs available is 255 on a single application.

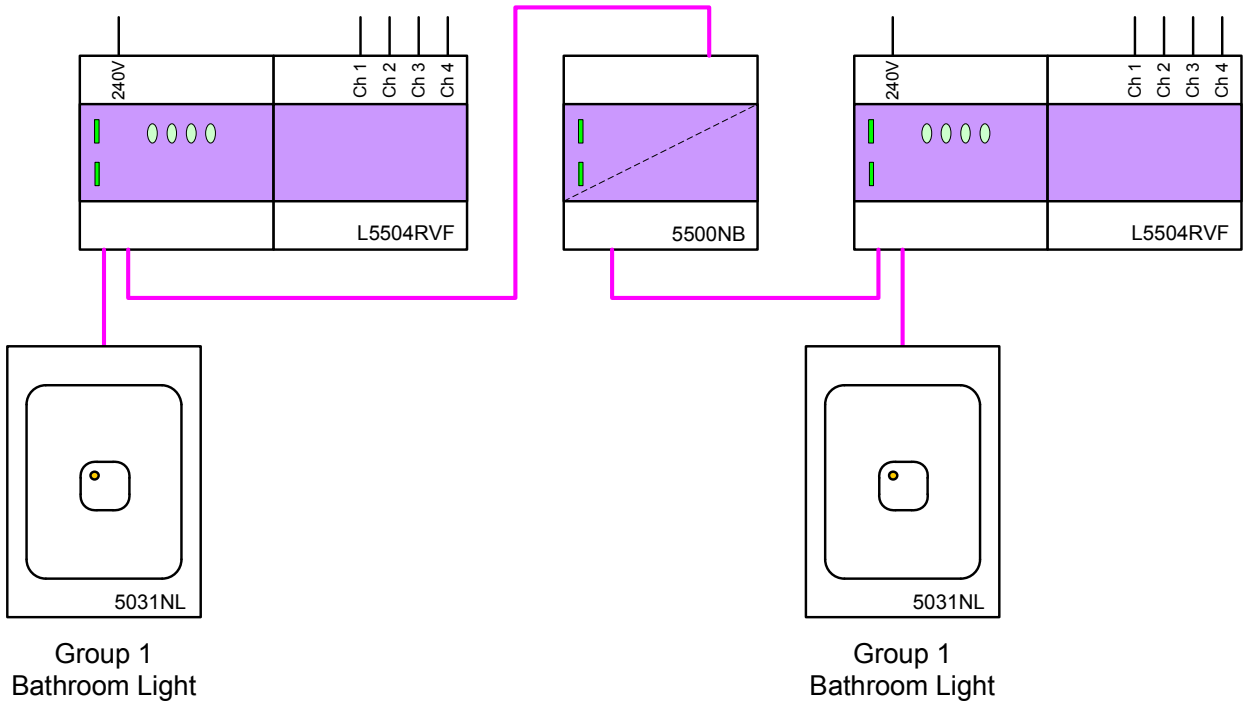


Figure 16 - Group Address Selections

Given a multistorey building where by master control of a Network is required from a central point, for example security personnel on the ground floor by a C-touch. Control from one floor to another by general users is not required and all the floors are identical.

It would save time if floors 1, 2 and 3 were programmed with the same group address using the copy tags feature. The Ground floor should use different Group address.

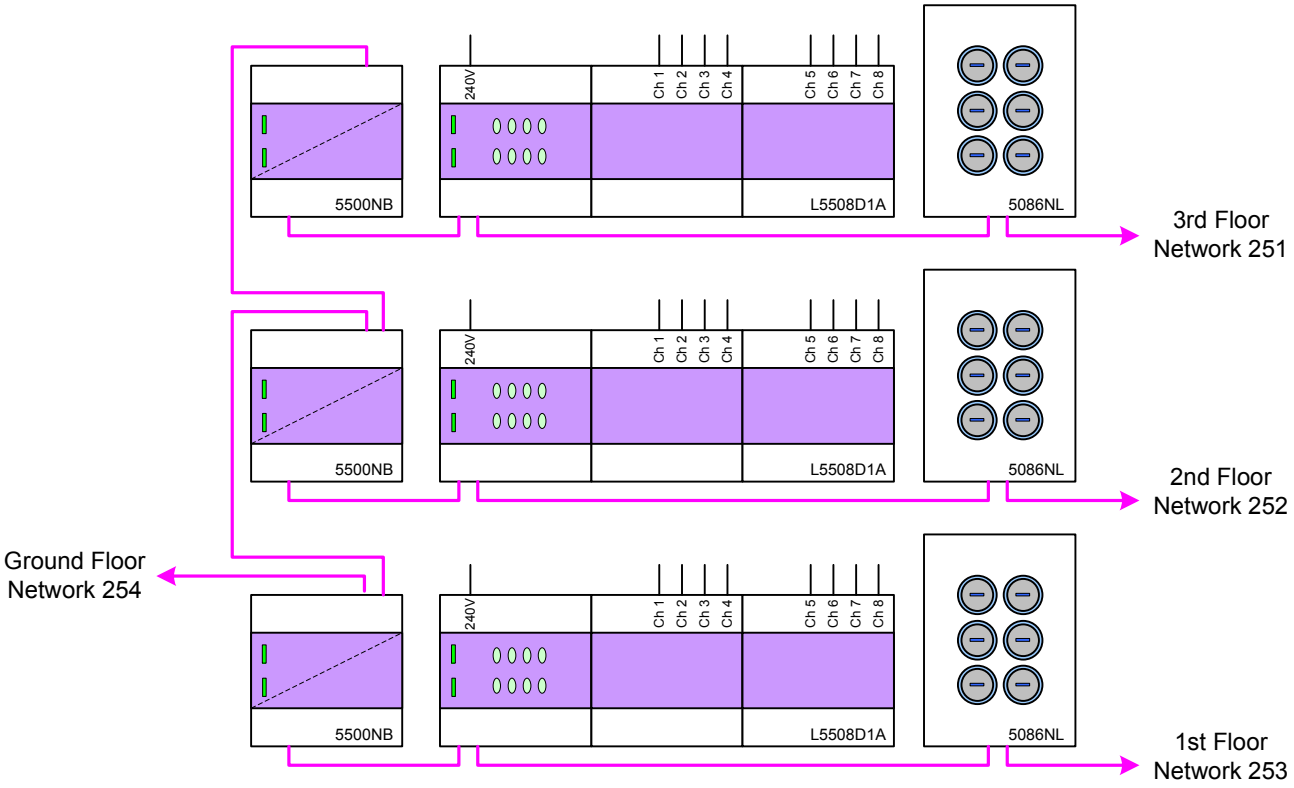


Figure 17 - Network Layout

The Bridges in this example would need to be programmed to pass messages to the adjacent Network, but not to any other Network. Given this situation the C-Touch could control and monitor each floor independently.

When there is a need to connect a remote building to the main building via C-Bus®, then it would be advisable to have separate Networks.

For example a house with a detached garage and the interconnecting cable is run under ground.

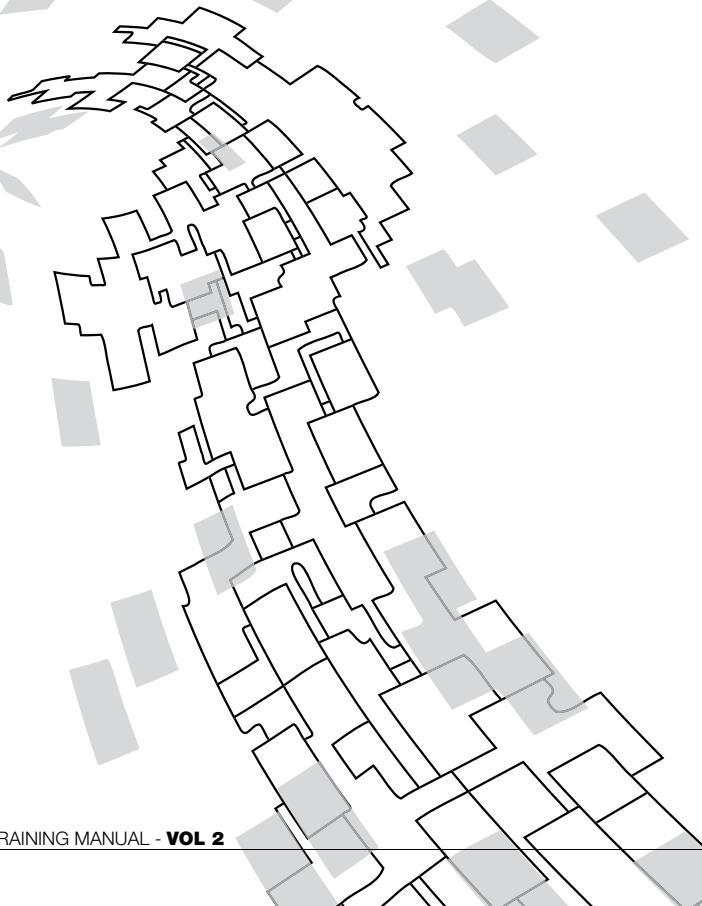
The bridges would need to be configured in such a manner that can pass messages from the remote Network.

The advantage in setting up the system in this manner is that if for any reason the underground run becomes faulty both Networks would continue to run in their own right, only losing communications between the house and garage.

5.1 Copy Tags

To facilitate the creation of group addresses on additional Networks there is a copy tags feature. Creating all the group address on one Network and using this feature will eliminate the possibility of the incorrect loads being operated on adjacent Networks that are configured to communicate with each other.

Volume 2F
Fault Finding



Scope

This manual aims to provide an installer with the basic understanding on how to fault find a basic C-Bus installation.

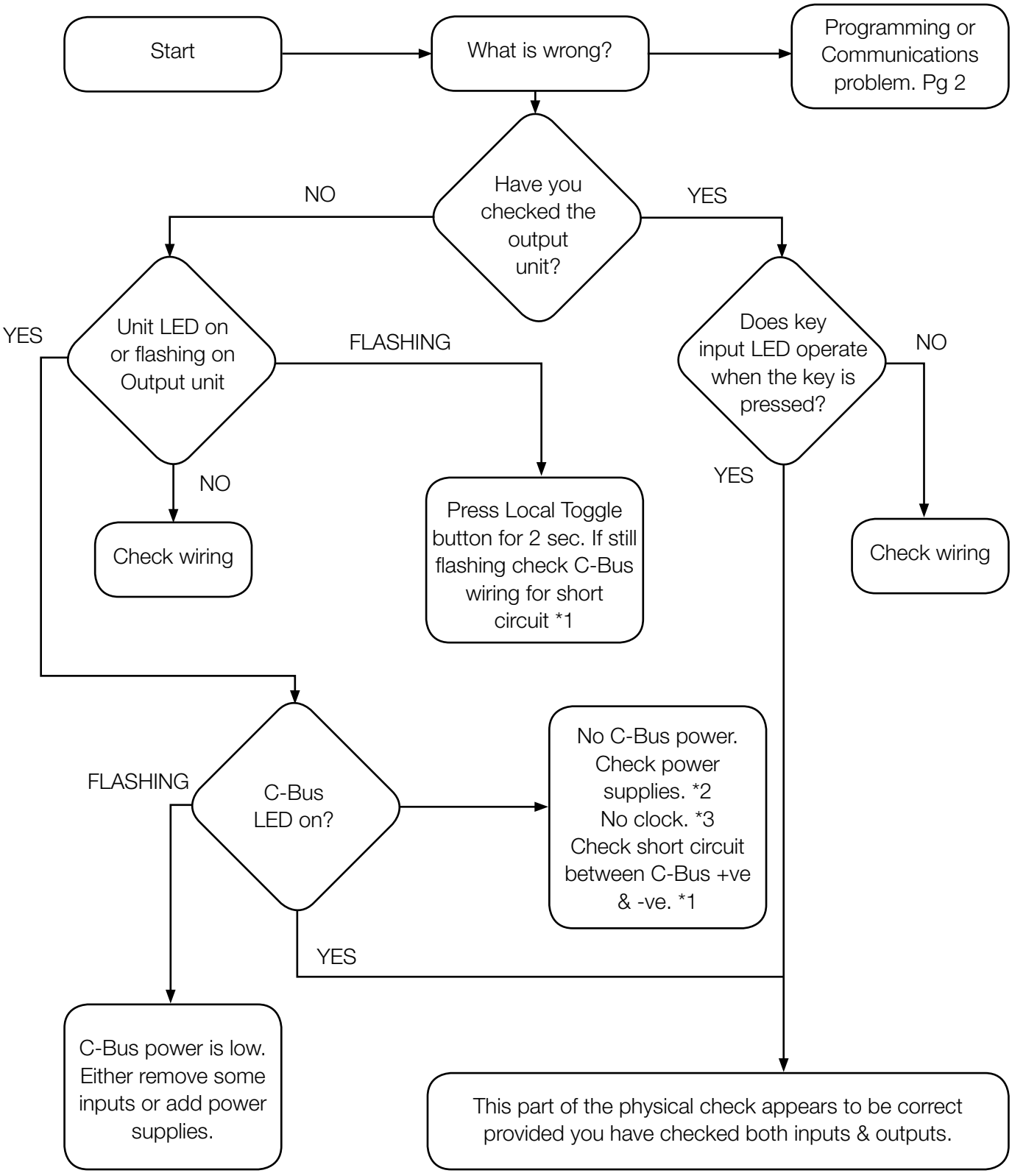
Learning Outcomes

By the end of this module, you should be competent in:

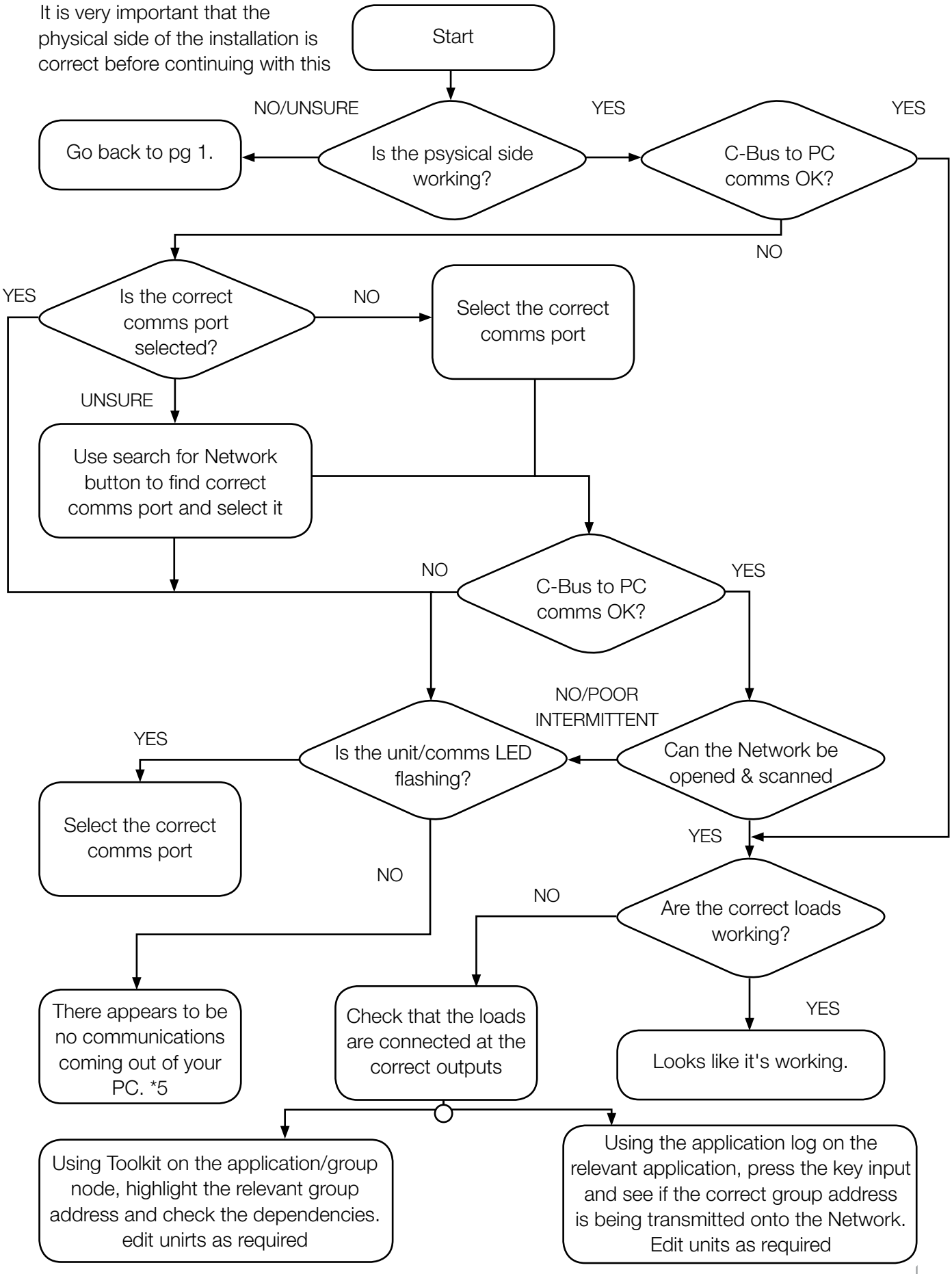
- Identifying simple software and hardware faults
- Resolving simple software and hardware faults.

1.0 Fault Finding Chart

The intention of this Fault Finding chart is to guide the user in deducing possible installation faults. It is not exhaustive and with experience you may be able to short cut certain areas.


Start
What is wrong?
Programming or Communications problem. Pg 2
Have you checked the output unit?
NO
YES
Unit LED on or flashing on Output unit
YES
FLASHING
NO
Check wiring
Press Local Toggle button for 2 sec. If still flashing check C-Bus wiring for short circuit *1
Does key input LED operate when the key is pressed?
NO
YES
Check wiring
C-Bus LED on?
FLASHING
No C-Bus power. Check power supplies. *2
No clock. *3
Check short circuit between C-Bus +ve & -ve. *1
YES
C-Bus power is low. Either remove some inputs or add power supplies.
This part of the physical check appears to be correct provided you have checked both inputs & outputs.

It is very important that the physical side of the installation is correct before continuing with this


Start
Is the psysical side working?
NO/UNSURE
YES
Go back to pg 1.
C-Bus to PC comms OK?
YES
NO
Is the correct comms port selected?
YES
NO
Select the correct comms port
UNSURE
Use search for Network button to find correct comms port and select it
C-Bus to PC comms OK?
NO
YES
Is the unit/comms LED flashing?
NO/POOR INTERMITTENT
Can the Network be opened & scanned
YES
Select the correct comms port
YES
NO
Are the correct loads working?
NO
YES
There appears to be no communications coming out of your PC. *5
Check that the loads are connected at the correct outputs
Looks like it's working.
Using Toolkit on the application/group node, highlight the relevant group address and check the dependencies. edit unirts as required
Using the application log on the relevant application, press the key input and see if the correct group address is being transmitted onto the Network. Edit units as required

1.1 Fault Finding Notes

Note *1

Checking the Pink cat 5 between C-Bus positive (Blue and Orange) and Negative (Blue/white and Orange/white). Use a multimeter start on the DC voltage range to confirm there is no voltage . Then change to the ohms range, and break the circuit down in to segments until the short can be identified.

If the Unit LED is flashing, check for short circuit between C-Bus negative and Brown/Brown-White and C-Bus negative and Green/Green-White.

Note *2

Power supply units check that there are sufficient Power supplies to power the system.

Din rail output unit with power provide 200 mA

Din rail stand alone PSU provides 350 mA

Pro series dimmers provide 60 mA

Typical current demands are:

- PCI =32 mA
- PIR's =18 mA
- Neo type Key Input =22 mA
- Standard Key input = 18 mA
- Mono touch screen = 40 mA
- Colour touch screen = 22 mA

Note *3

If there is no clock present on a C-Bus2 system, and you do not have an alternative device capable of generating a clock (with its clock enabled) that may be connected to the system then, use learn mode to enable the clock. Enter learn mode and wait until the unit light and C-Bus light flash alternatively. This may take a while if after one minute the lights are not flashing alternatively then come out of learn mode and try again.

Note *4

Confirm you have one burden if suggested by toolkit, (as a general guide if you have less than 70 units you will need one burden).

If you do not have a hardware burden on the network and it appear to have communications problems, adding a burden may help. If possible add a hardware burden, if not, a software burden may be enabled using learn mode.

Note*5

There appears to be no communications coming out of your computer.

Check the RS 232 cable possibly the easiest way would be to try another one

Are you using an USB to RS232 converter if so check that it is present on the device manager list and what comms port is it assigned to. Using the Help feature window provides type in device manager.

Also have the drivers that come with the converter been installed see the manufacturer's info.

Intermittent Faults

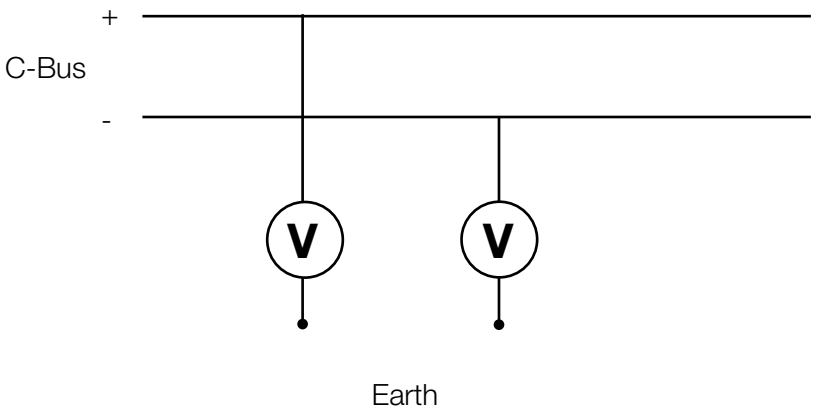
Intermittent faults are somewhat harder to diagnose.

Check the following, which have proven to be some of the more common issues:

- C-Bus cables all correctly terminated and dry.
- Check C-Bus voltage is in the correct range.

Add one extra unit at the far end of the C-Bus to see if the network fails. If either of the above, add additional power supply.

Check voltage as below:



Each reading should be similar, if not, look for one of the C-Bus lines gone down to earth. Possibly twisted around front plate screw of key input unit.

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